

BITS

computing & communications

THIRD EDITION
Introduction to Computing
at Los Alamos

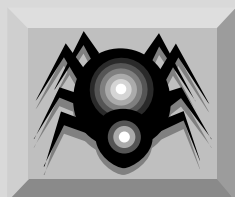
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COMPUTING, INFORMATION, AND COMMUNICATIONS (CIC) DIVISION • LOS ALAMOS NATIONAL LABORATORY



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This friendly spider indicates a connection to either the Laboratory network or the World Wide Web (WWW, Web). When you see the spider icon, look for a path name such as Computing at LANL/Welcome to the Integrated Computing Network or a Web address such as <http://www.lanl.gov>. Further directions for using the Lab networks and the WWW are contained in this document.

Because of the wide variety of CIC computing services, numerous facilities are available to address your questions. If you are uncertain whom to call, you can always call the Customer Service Center (CSC). CSC consultants are trained to either answer your question or locate someone who can. To reach the appropriate consultant, dial 665-4444 and make your selection from the following choices:

- Option 1: New user topics including e-mail, passwords/smartcards, and World Wide Web.
- Option 2: Labwide systems such as Travel, Time and Effort, and Purchase Cards.
- Option 3: Scientific computing, storage systems, and networking.
- Option 4: Classroom instruction and training.
- Option 5: Desktop consulting for PC and Macintosh software and network configurations.

Consulting Via E-Mail

| | |
|--|--------------------|
| Customer Support..... | cichelp@lanl.gov |
| Scientific and engineering computing..... | consult@lanl.gov |
| Administrative and business computing..... | labwide@lanl.gov |
| Passwords and registration..... | validate@lanl.gov |
| Macintosh computing..... | Mac-help@lanl.gov |
| PC computing..... | PC-help@lanl.gov |
| UNIX computing..... | UNIX-help@lanl.gov |

Other Useful Numbers

| | |
|------------------------------------|--------------------------|
| Advanced Computing Laboratory..... | 665-4530 |
| Central Computing Facility..... | 667-4584 |
| Network Operations Center..... | noc@lanl.gov or 667-7423 |
| Telephone Services Center..... | 667-3400 |

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ACRONYM LIST

| Acronym | Meaning | | |
|---------|---|--------|---|
| ACFS | Advanced CFS Interface | lhost | your local workstation |
| ACL | Advanced Computing Laboratory | LPQ | line printer queue |
| ACS | Account Control System (for the ICN) | LPR | line print request |
| ADSM | Adstar Distributed Storage Manager | LPRM | line printer/remove files |
| AIX | IBM version of UNIX, a computer operating system | LSF | Load Sharing Facility |
| ASCI | Accelerated Strategic Computing Initiative | LWW | Library Without Walls |
| BSD | Berkeley Software Design, Inc. | MIMD | multiple instruction, multiple data |
| CCF | Central Computing Facility | MPI | message-passing interface |
| CFS | Common File System | MPP | massively parallel processor |
| CFSGW | CFS gateway access | NFS | network file server |
| CGS | Common Graphics System | NOC | Network Operations Center |
| CIC | Computing, Information, and Communications (Division) | OCSR | Organizational Computer Security Representative |
| CLAMS | common Los Alamos mathematical software | ONCS | Open Network Compute Server (Cluster) |
| CPU | central processing/processor unit | OT | open transport |
| CSC | Customer Service Center | PAGES | Print and Graphics Express Station |
| CSSO | Computer Systems Security Officer | PDF | portable document format |
| DCE | distributed computing environment | PE | processing element |
| DEC | Digital Equipment Corp. | PIN | personal identification number |
| DGL | Distributed Graphics Language | POP | post office protocol (e-mail) |
| DNS | domain name system | PAGES | Print and Graphics Express Station |
| DoD | Department of Defense | PPAGES | printing command for PAGES file shipper |
| DOE | Department of Energy | PPD | PostScript printer description |
| EIS | Employee Information System | PPP | point-to-point protocol |
| ESD | Electronic Software Distribution | PVM | Parallel Virtual Machine |
| FTP | file transport/transfer protocol | RAID | redundant array of inexpensive drives |
| GUI | graphical user interface | RAM | random-access memory |
| HP | Hewlett Packard | rhost | remote computer (not your local workstation) |
| HPF | High Performance Fortran | SGI | Silicon Graphics, Inc. |
| HP/UX | Hewlett Packard version of UNIX | SIMD | single instruction, multiple data |
| HTML | hypertext mark-up language (for the Internet) | SLIP | serial line Internet interface protocol |
| I/O | input/output | SNCS | Secure Network Compute Server (Cluster) |
| IA | Information Architecture | SPARC | scalable processor architecture |
| IA | Labwide administration services machine | SRAM | static random access memory |
| IB | Labwide administration services machine | TA-3 | Technical Area 3 |
| ICN | Integrated Computing Network | T3D | massively parallel supercomputer |
| IES | Import/Export Service | TIG | terminal Internet gateway |
| IMP | Integrated Management Process | TMC | Thinking Machines Corporation |
| IMSL | International Mathematical & Statistics Library | UID | UNIX user identifier |
| IP | Internet protocol | UNICOS | Cray version of UNIX |
| ISDN | Integrated Services Digital Network | URL | universal resource locator (Web address) |
| JIT | just-in-time | VMS | Virtual Memory System |
| LAN | local area network | VR | virtual reality |
| LANL | Los Alamos National Laboratory | VTERM | VT100 Terminal Emulation |
| LDAP | lightweight directory access protocol | Web | World Wide Web |
| | | WWW | World Wide Web |

Computing at Los Alamos National Laboratory (LANL) for the Uninitiated

If you are a new employee or contractor at LANL and need to use a computer to get your job done, it may seem like there is a lot to learn and do before you can get started. If you are an experienced computer user, it may be easier, but there will still be some areas of knowledge or expertise that you will need. Becoming productive within the LANL computing environment is not always easy and straightforward. This publication is meant to improve that situation.

More than likely, when you arrive at a new position, you will already have most of the computing environment defined for you. If you are to have a computer, one will probably be waiting for you. (In fact, the Lab average indicates that many people will have two or more.)

Most workstations are connected to some form of network (there are many different types of connections), and some are not networked at all (they just work as stand-alone machines). The computing environment provided by the Computing, Information, and Communications (CIC) Division is referred to as the Integrated Computing Network (ICN). It includes large centralized computers, Labwide networks and connectivity, and workstation capabilities.

The reasons for this variety are quite simple:

- First, the Lab is a BIG place geographically, and it is expensive to run cables everywhere. This means that over the years some parts of the Lab have become more updated in communications technologies than others.
- Second, the computing facilities at various places in the Lab were never on a par (i.e., the weapons programs serving the Lab's primary mission tended to receive the more advanced services and facilities).
- Third, many groups and divisions have established local computing centers and, consequently, established their own standards for hardware, software, and communications.
- And, lastly, the culture of Los Alamos has always paralleled research and university cultures and has had no centralized, standardized, institutional philosophy of who ought to buy what in hardware, software, and communications.

So computing environments at Los Alamos grew in various and sundry ways, rates, and directions.

To improve this situation, two major initiatives are moving LANL toward a more uniform environment.

- The first is "LANLNet," a five-year project to rewire much of the Lab to ensure a consistent standard of communications, from the port on the wall to the networking infrastructure.
- The second is the Information Architecture (IA) Project, which is a Laboratory-wide



effort to address standardization of our computing, information, and communications. This effort has resulted in design guidelines, hardware and software standards, and unified processes that help create an integrated environment.

These and other factors are moving the computing environment toward becoming more interoperable, compatible, and universal.

To help you get started, see the tables in Section 1.2 that provide a checklist for the resources, facilities, or capabilities you may need. Use the information in this publication to assist in accomplishing these tasks.

Most groups or divisions have one or more people assigned to assist users with computer problems. This person, often called the “local system administrator,” “network administrator,” or “computer person,” may be from the Desktop Group (CIC-2) or a member of your own group or division. Check with your group to find out who this person is because he/she is responsible for helping you with much of your setup for using computing resources.

That’s a thumbnail sketch of what may lie ahead for a new computer user at LANL. The following pages have a tremendous amount of information and may tend to overwhelm anyone who is new to LANL. However, it is all important, and this quantity of information is just the result of having a place in which a lot of things have happened in the past, and in which great things are happening in the present. Please wander through the information as you need and don’t hesitate to call the CIC Customer Service Center (CSC) at 665-4444 to get help.

**Don Willerton, Group Leader
Customer Service Group (CIC-6)**



1. ENTERING THE LOS ALAMOS COMPUTING ENVIRONMENT

1.1. About This Publication

The use of computers is becoming an essential part of doing business at Los Alamos. While they enable us to do many more tasks, computers also may present problems, especially for new and occasional (casual) users. This publication will help make the transition to the Los Alamos computing environment quicker and more productive while reducing stress and confusion. It is designed to provide an overview of the primary computing resources and to serve as a road map to additional information.

The World Wide Web (WWW) is the primary repository for information at the Laboratory. Each section of this publication will provide references to Web locations that will enable you to broaden your knowledge. Within this publication, the Web location is referenced from the LANL Home Page using a path name such as



*Computing/CIC Organizations/
Services*

or to a Web universal resource locator (URL) such as

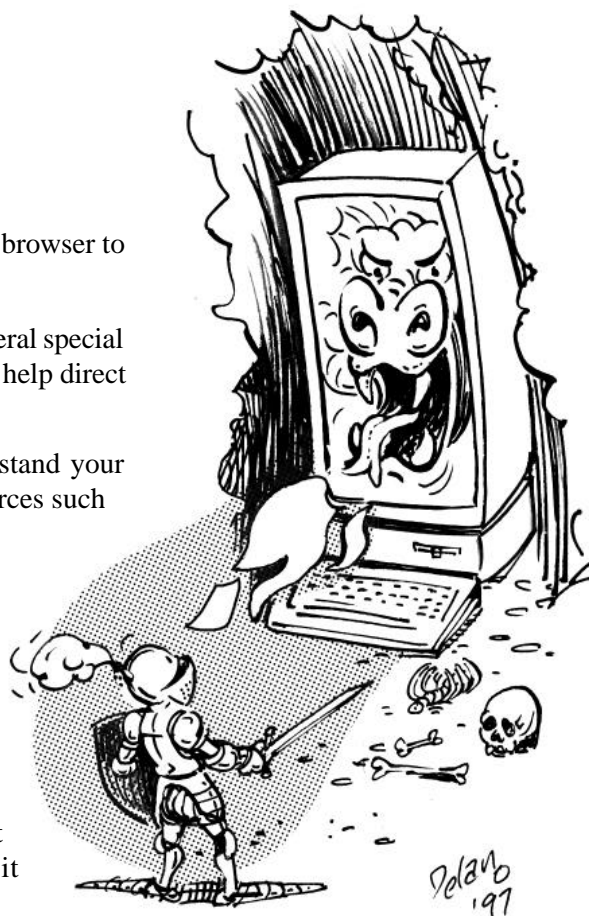


<http://www.lanl.gov>

Later in this publication you will be shown how to set up your Web browser to access a Web URL directly [Section 5.5.].

The Los Alamos computing environment can be segmented into several special areas. This publication is composed of the following seven areas to help direct you to those resources that are of primary interest to you:

- Introductory information to help establish terminology, understand your computer security responsibilities, and locate supporting resources such as the various help desk organizations [Section 1].
- How to determine your networking requirements [Section 2].
- Desktop hardware and software support and where and how software distribution and configuration are accomplished. Most users, particularly those of business systems should refer to this section [Section 3].
- Information needed to work in the Integrated Computing Network (ICN) environment and how to use the validation, registration, authentication, and charging mechanisms. Most scientific computing users and those who have explicit networking needs should refer to this section [Section 4].
- Information needed to use the common computing resources at Los Alamos. If you have storage or printing needs, you will find this information helpful [Section 5].



- An introduction to the use of Enterprise Information Applications (EIA), formerly known as Labwide Business Information Systems, where most administrative computer applications are provided [Section 6] .
- Information on computer training classes [Section 7].
- An introduction to the use of scientific computing resources [Section 8].

There are three major realms of computing functions at Los Alamos, as follows:

- The “Internet Only” realm is where you can use the Web, get e-mail, run computer programs locally, print to local printers, run desktop software, etc., and don’t have to use an ICN password, a secure identification card, i.e., “smartcard,” or any other authorizations. This realm looks like a home computer that’s tied to the Internet through an Internet provider.
- The “Administrative” realm allows you to access the administrative computers, institutional data, the LANL Data Warehouse, and all of the Enterprise Information Applications, like Time and Effort, Property Database, Employee Information, Data Warehouse, Travel, and many others. You will probably need a smartcard and an ICN password for these functions.
- The “Compute Server” realm is focused on providing you with the large machines like Cray YMP, SGI Origin 2000, and workstation clusters. The descriptive words are “lots of cycles,” “lots of storage,” and “lots of bandwidth.” You’ll need an ICN password for these.

The computing resources are divided into the “open” and “secure” environments. These are physically separate networks where classified computing can be performed only on the secure side. For the secure side, you’ll need a secure ICN password.

Beyond this capability, some individuals may need to access the Advanced Computing Laboratory (ACL) (665-4530) for research in advanced computer architectures or networking or to connect with the Grand Challenge programs.

You will be sharing the ICN with a large user community that includes Laboratory employees, visiting staff members, and people working at other facilities on diverse research efforts. This user community has a constantly expanding variety of application and performance requirements that make it necessary to provide support for a wide range of hardware and software.

Many of the resources of the ICN are located at Los Alamos in Technical Area-3 (TA-3), Buildings SM-132 and SM-1498 (the Central Computing Facility—CCF). The ICN and the computing resources it provides are supported and maintained by CIC Division.

1.2 Getting Started

To help you get started Tables 1.1. and 1.2. provide a checklist for the resources, facilities, or capabilities you may need. Use the information in this publication to assist in accomplishing these tasks.

Table 1.1. To prepare for computing at Los Alamos

| Action | Reference | A Source for Help |
|--|------------------|---|
| Have your personal data entered into the Employee Information System. | 5.2.8 | Your Group Secretary or CIC-6, 665-4444* |
| Determine if an ICN password or smartcard is needed, and submit a validation form. | 4.2. | Password Office, 665-4444 |
| Define the type of workstation you need. | 2.1. | CIC-6, 665-4444 |
| Determine your network connection. | 2.2. | CIC-5 NOC, 667-7423 |
| Determine required networking software and hardware. | 2.3., 2.4. | CIC-6, 665-4444 or CIC-5 NOC, 667-7423 |
| Obtain and install Netscape. | 5.5. | CIC-6, 665-4444 |
| Obtain and install e-mail. | 5.2. | CIC-6, 665-4444 |
| Establish “authorities” for EIA. | 6.2. | CIC-6, 665-4444 |

* When you call the phone number for the CIC Customer Service Center (665-4444), listed throughout this document, you will then choose from a menu that will direct you to the most appropriate source to answer your question. [Section 1.5]

Table 1.2. Upon receiving your ICN password, you may access the Register facility to do the following:

| Action | Reference | A Source for Help |
|---|------------------|--------------------------|
| Register your e-mail address. | 5.2.7. | CIC-6, 665-4444 |
| Register for a post office protocol (POP) server (Eudora e-mail). | 4.3. | CIC-6, 665-4444 |
| Register for ICN computers (UNICOS, Cluster, etc.). | 4.3. | CIC-6, 665-4444 |

1.3. Overview of Los Alamos Computing Resources

The ICN is LANL’s primary computer network. It provides controlled access to and support for a wide variety of computing resources. These resources generally fall into one or more categories as follows:

- Network services for access to the Internet with support for connectivity to local area networks (LANs) at LANL— permits log-in from dial-up and remote computers;
- Registration services for e-mail, compute servers, and software distribution;
- Common support services such as e-mail distribution, storage, and output routing;
- Business support services for Laboratory-wide administrative systems;
- Large-scale scientific computing; and
- General desktop computing.

1.3.1. Clients and Servers

Servers are computers that perform specialized services for many users or for other computers in the network. The recipient of these services (such as your workstation) is called a “client.” There are a variety of servers that perform such functions as computing, security, data storage, information retrieval, e-mail, accounting, and production control.

Computing/Compute Servers



*Computing/CIC Organizations/
Organization/CIC-7/Machines*

1.3.2. Compute Servers

Compute servers or workers execute user programs to perform numerical computations that are at the heart of most scientific, engineering, and administrative applications. A variety of compute servers employ different operating systems.

- UNIX (Cellular IRIX) SGI/Origin 2000,
- UNICOS on Cray computers in both the open and secure environments,
- UNIX (AIX) on Cluster Systems,
- UNIX Sun workstations and front-end processors for the Connection Machine, and
- The Labwide administration applications on machines IA and IB.

The computers are generally identified by a short name such as “theta” or “gamma.” Some computers provide for specialized applications such as those on the IA and IB machines.

Computing/

*CIC Organizations/Organization
CIC-5 Network Engineering*



1.3.3. Networks

The ICN uses the TCP/IP (transmission control protocol/Internet protocol) originally developed for the Department of Defense (DoD) “ARPANET,” which is now the most widely used Network protocol. Most vendor and third-party software assumes the presence of TCP/IP.

TCP/IP and the UNIX operating system provide the foundation on which CIC Division has built a distributed computing environment. Because this foundation is constructed from standard hardware and software, ICN users are able to take immediate advantage of the many tools and software applications available from all over the world. Use of these tools permits workstations, supercomputers, and specialized processors to be linked into a single, integrated computing system—the ICN.

Each ICN security environment is networked independently. There are no connections between the open and secure networks.

Computing/

*CIC Organizations/Organization/
CIC-4 Telecommunications*



1.3.4. Communications

Communications into the ICN are handled by specialized computers in the CCF that direct, validate, and control your communications to the ICN resources in a way that is almost transparent to you. Both network connectivity (TCP/IP) and dial-up service (ISDN—Internet Services Digital Network) are provided.

Computing/

Network Resources/TIG



1.3.5. Terminal Internet Gateway (TIG) Services

The TIG permits dial-up, point-to-point protocol (PPP) access to Laboratory computers or to Internet hosts from asynchronous terminal emulators (VersaTerm, TN3270, etc.).

1.3.6. Common File System (CFS)

The CFS is a large central data storage and retrieval system for the worker computers and distributed processors. The CFS is used for long-term and archival storage.

The Mercury system provides the ability to move unclassified data files between the secure and open CFS in a secure, controlled, and auditable way. Because of some of the ways we have had to implement security requirements, there may be several hours delay when moving data in this manner.



*Computing/
CIC Organizations/ Organization/
CIC-11 Storage Systems/CFS*



*Computing/
Compute Resources/
Mercury*

1.3.7. Adstar Distributed Storage Manager (ADSM)

ADSM is a file storage and backup service available in both the open and secure networks. It provides automated file backup of workstations and personal computers and has an archival file storage capability for large files. ADSM's file size is limited only by the constraints of the operating system communicating with it and supports all of the desktop platforms here at Los Alamos, including PCs running Windows 3.x, 95 & NT, and OS/2, Apple Macintosh, and virtually every flavor of UNIX workstation. Additionally, ADSM can be used to perform backups of very large databases by utilizing Connect Agents for Oracle, SYBASE, DB/2 and Lotus Notes.



*Computing/CIC Organizations/
Organization/CIC-11 Data Storage
Systems/ADSM*

1.3.8. Network File Server (NFS)

The NFS is an ICN service that allows UNIX files to be located remotely and yet appear to be local to compute servers and workstations. NFS promotes distributed computing by allowing data to be computed on supercomputers with results displayed on a workstation without requiring the user to move files.



*Computing/CIC Organizations/
Organization/CIC-11 Data Storage
Systems/NFS*

1.3.9. Import/Export Service (IES)

IES provides a method to move electronic files into and out of the Laboratory securely using popular forms of media. The IES supports 1/2-inch 3480/3490 tapes, 4-mm, 8-mm, 1/4-inch tapes at several densities, and all of the DLT (digital linear tape) formats up to the new DLT IV (35 Gigabytes). IES now supports CD-ROM (both read and write capability) and IOMEGA JAZ and ZIP formats. The export function copies entire CFS trees onto media in a "tar" format that can be easily restored to CFS or some other system at a later time. Optionally, IES can write the files in standard PC or Macintosh format. The import function provides for a binary transfer of tape or disk files into CFS.



*Computing/
Compute Resources/
Import/Export Svc*

1.3.10. Print and Graphics Express Station (PAGES)

PAGES provides centrally located hard copy devices such as film recorders, plotters, and high-speed laser printers for your text and graphics output.



*Computing/CIC Organizations/
Organization/CIC-11 Media/
PAGES*

1.3.11. High Performance Storage System (HPSS)

HPSS provides a highly scalable, highly parallel hierarchical storage system with improvements in performance and capacity by at least two orders of magnitude. As of this writing, HPSS is currently in transition from being a system with limited availability in user-friendly status to a widely deployed production quality storage system. For archival storage, HPSS is expected to eventually replace CFS. To find out the current status and availability, visit the HPSS Web



*Computing/CIC Organizations/
Organization/CIC-11 Data Stor-
age Systems/HPSS*



site at <http://storage.lanl.gov/cic11/hpss.html>. The Parallel Storage Interface (PSI) is the recommended application for access to HPSS.

1.4. Computer Security

Computer security is something we at LANL take seriously. As a Los Alamos computer user, you are required to follow security policy that is set by the U.S. Department of Energy (DOE). Failure to follow this policy will result in removal of your computing privileges, possible discipline (administrative reprimand, security infraction, or even termination), and/or prosecution when deemed appropriate. Please know what is required of you!

The ICN is divided into two computing environments to provide flexibility in services and protection for classified and sensitive information. You must always be aware of the environment you are working in and the security level of the material you are working with.

- The open/administrative environment is used for processing unclassified and unclassified sensitive data only.
- The secure environment is used for processing secure, classified, and national security material.

All users at LANL are required to have training in computer security. The Computer Systems Security Officer (CSSO) and Organizational Computer Security Representative (OCSR) for your organization are responsible for providing your training. If you are unsure who your CSSO and OCSR are, ask your manager.

All Laboratory computers, computing systems, and their associated communication systems are to be used only for official business and must be protected in accordance with property protection and security rules. In addition, software must be legally procured, and you must maintain records of ownership, such as proof of license requirements, software documentation, or the original application disks to prove that you are the authorized owner. You must not duplicate or use copyrighted or proprietary software without proper authorization.

FILE AUDITS—Your management, OCSR, CSSO, the Security Division, the CIC Division, and the DOE have the authority and the responsibility to audit your files on any computing system used for Laboratory business to ensure that you abide by these rules.

UNREQUESTED OUTPUT—If you receive output from the ICN that you did not request (such as hard copy printout or a display on your workstation), contact the ICN Password Office (665-4444 option 1) during normal working hours. Between 5:00 p.m. and 8:00 a.m. (local time) and on weekends/holidays, contact the CCF supervisor (667-4584).

ICN ANOMALY DETECTION—To ensure the security of your ICN computing files and activities, the network is regularly scanned for anomalies (such as a large number of failed log-on attempts). These are investigated and, if deemed suspicious, are called to your attention.

WATCHER—Watcher is an automated tool that assists in detecting misuse of LANL computing systems by monitoring Internet traffic at the Laboratory. Watcher looks for indicators showing that government computing resources might possibly be supporting other-than-official uses. Watcher reports are provided to the Laboratory's Internal Evaluations Office, which uses that information to help determine where to focus their investigations.

SECURITY INCIDENT RESPONSE TEAM (SIRT)—This team is called when an OCSR or system administrator or user determines that a security situation merits expert investigation and guidance. Report any suspicious activity or actual incident immediately to your OCSR. Your OCSR will, in turn, report it to the Computer Security Group (S-5) where time constraints will be determined for possible incident reporting to DOE/AL and DOE/HQ. If expert investigation and guidance are needed, call SIRT at 667-7423 or send e-mail to lanl-sirt@lanl.gov.

1.4.1. Responsible Use of LANL Computing Resources

LANL computing resources are for “official use only,” which means any use justifiable as being related to conducting Laboratory business. Official use includes activities obviously required for one's job, such as engineering computations, scientific research, sharing technical information for review, comment and information exchange, technical collaboration as part of one's research activities, office correspondence, and administrative record keeping.

“Unacceptable use”—activities that constitute unacceptable use of Laboratory computers or network facilities include the following:

- Use of government equipment for personal gain,
- Use for political purposes (e.g., lobbying),
- Illegal or immoral activities (e.g., fraud, embezzlement, theft),
- Unauthorized entry to other computers or networks or distributing viruses,
- Misusing or forging e-mail, or tampering with the Laboratory e-mail system,
- Activities likely to result in embarrassment to the Laboratory or DOE, (e.g., reading or distributing pornography, making libelous statements),
- Any activities explicitly prohibited by LANL policy (e.g., sexual harassment, gambling), and
- Use that interferes with job performance for an unauthorized purpose (e.g., using a Lab laptop to calculate sports statistics or balance a personal checkbook).

1.4.2. Protecting Passwords and Smartcards

All ICN passwords and smartcard personal identification numbers (PINs) must be protected, regardless of whether they are used for unclassified or classified processing. If you are an ICN user, you are responsible for the proper storage and handling of your password and/or smartcard and PIN. By signing a receipt for your ICN password and/or smartcard, you agree not to misuse the ICN and to be responsible for activity associated with your user number and password/smartcard PIN.



*Organization/
Facilities, Security, and
Safeguards Division/
Security and Safeguards
Division/ S-7 Classification*

ICN passwords and smartcard PINs for unclassified access are sensitive information (official use only) and must be handled accordingly. Passwords for classified computing are considered Secret, National Security Information, and if written down, become classified documents. They must be marked and stored according to standard Laboratory procedures for marking and handling classified data.

- DO NOT give anyone your password or smartcard PIN or allow anyone to use them to gain access to the Laboratory's computers.
- DO NOT leave your password or smartcard PIN where others may view them. Never tape them to your terminal!
- NEVER store your ICN password or smartcard PIN on-line or on any computer or terminal.
- If you think your password has been compromised, change it using the ICN Registry or contact the ICN Password Office immediately.
- If you think your smartcard PIN has been compromised, call the ICN Password Office to have the smartcard reset, and then use the ICN Registry to set the PIN.

<http://register.lanl.gov>



1.4.3. Responsibilities upon Termination or Transfer

If you terminate or transfer from LANL or a contract organization and are an ICN user, there are several things you need to do.

- Destroy documentation that contains passwords or smartcard PINs.
- Return smartcards to your group office.
- Remove machine authorizations using the Register facility.
- Transfer appropriate e-mail names to another individual.
- Delete or give someone else full access to your files on CFS (your files will not automatically go away when your account is removed from the ICN).
- Update the Employee Information System (EIS) and change codes if transferring.

1.4.4. Use of Personal Computers Off-Site

Personal computers may be used for Laboratory business off-site when the following conditions are met:

1. Laboratory rules for removing and protecting government property, as applicable, must be followed (Material Management Manual, Section 1).
2. All Laboratory-owned systems processing off-site are subject to the Laboratory's Computer Security Program's policies and procedures.
3. All non-Laboratory-owned systems processing sensitive unclassified information off-site are subject to the Laboratory's Computer Security Program's policies and procedures.
4. Stand-alone off-site systems are for processing unclassified information only.
5. Individuals processing information off-site may be held personally liable financially for its loss, damage, destruction, or unauthorized disclosure while it is in their custody (Laboratory Office Procedures Manual, Section 7-2).
6. All software on Laboratory-owned systems used for off-site processing shall be properly licensed and shall be virus-tested.

7. The use of privately owned software on systems that are processing off-site is permitted if the software is fully licensed and has been virus-tested.
8. Laboratory-owned systems require a software review and virus check when returned to the Laboratory.
9. All Laboratory-owned systems are subject to being called back to the Laboratory for an audit by security and/or management officials.

1.4.5. Use of Non-Laboratory Computers On-site

Non-Laboratory-owned microcomputers/word processors (systems) may be brought on-site for Laboratory work when the following conditions are met:

1. Systems are to be used for processing unclassified information only.
2. Each system must have a properly executed “Non-Laboratory Owned Systems at LANL” form kept with it at all times.
3. Non-Laboratory-owned systems may not be connected to any other computing or telecommunication resource unless prior written approval is given by organization management and the OCSR. When a non-Laboratory system is connected to a Laboratory computing resource or telecommunication resource, it immediately becomes subject to the Laboratory Computer Security Program’s policies and procedures, and a certified Addendum to the Master Computer Protection Plan must be on file with the responsible OCSR.
4. For systems that are to be on-site for 90 days or longer an approved/certified Addendum must be on file with the OCSR, and you must have read and signed the “Users Computer Security Responsibilities” form.
5. Non-Laboratory-owned systems shall not be taken into a technical security area without prior approval from DOE.
6. All software on non-Laboratory-owned systems shall be fully licensed.
7. All software and information on non-Laboratory-owned systems shall be virus-tested. Virus testing shall be performed on a continuing basis.
8. All non-Laboratory-owned systems that are brought on-site are subject to audit by security and/or management officials.



*Organization/Facilities, Security,
and Safeguards Division/
Security and Safeguards Division/
Computer Security*

1.5. Consulting and Training Services

The initial point of contact for any question about CIC computing services is the CIC-6 Customer Service Center—CSC (665-4444). The CSC is made up of 7 teams that represent focused areas of service within the LANL computing environment. There is no charge for consulting services, which (with some exceptions) are available Monday through Friday, 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. local time. Questions that cannot be answered by one of the teams will be referred to another source. A description of each team follows.



*Computing/Consulting Support/
Services and Teams*

1.5.1. Customer Support

Most questions concerning e-mail registration, ICN validation, the Web, and POP (post office protocol, e-mail) servers will be answered at this level.

Voice: 505-665-4444 option 1
FAX: 505-667-5304
E-mail: cichelp@lanl.gov



ICN Password Office Team: (L to R) Lourdes Martinez, Phil Villareal, and Wanda Dunlop

1.5.2. ICN Password Office

The Password Office provides ICN passwords and LANL smartcards.

Voice: 505-665-4444 option 1

FAX: 505-667-9617

E-mail: validate@lanl.gov

1.5.3. Labwide Consulting

This team provides consulting for the EIA systems used throughout the Laboratory such as the system that tracks employee development, the system property administrators use for property accounting, or the system for submitting and approving travel expenses. See Table 6.1. for a complete listing.

Voice: 505-665-4444 option 2

FAX: 505-665-6647

E-mail: labwide@lanl.gov



Labwide Systems Consultants: (L to R) Lorena Salazar, Elizabeth Abeyta, Brian Martinez, Vonetta Pompeo, and Mary Billen

1.5.4. ICN Consulting Office

This team provides consulting services on a wide variety of topics that typically relate to scientific or engineering computing as follows:

- Programming languages (in particular FORTRAN and C),
- System libraries,
- Graphics libraries,
- Utilities,
- Command languages,
- Assistance with debugging codes,
- Use of controllers, and
- Network communications.

Voice: 505-665-4444 option 3

FAX: 505-662-5304

E-mail: consult@lanl.gov



ICN Consulting Office Team: (L to R) Bob Boland, Jeff Johnson, David Kratzer, Dale Leschnitzer, Sara Harshman, and Ted Spitzmiller

1.5.5. Training, Development, and Coordination Team

The Training Team offers a wide variety of training programs to assist you in making the best use of computing resources. The team coordinates four primary areas of training:

- Communications (e.g., Eudora, Meeting Maker)
- EIA (e.g., Data Warehouse, Employee Information, Travel)
- Advanced technical training (e.g., C++, Java, UNIX)
- Web (e.g., HTML—hypertext markup language, Netscape)

A complete list of training courses and schedule dates is available from the Laboratory's training Web site.

PC and Macintosh applications training (such as Excel, Windows, etc.) is provided by the University of New Mexico-Los Alamos.

If you are unsure of what kinds of training are available or how you might benefit from training, you are encouraged to call the CIC-6 Training Office for personal consultation.

Voice: 505-665-4444 option 4
FAX: 505-667-5304
E-mail: cic6-train@lanl.gov

1.5.6. Desktop Consulting

The Desktop Consulting Team is available to all LANL employees and contractors for assistance with Macintosh and PC workstations as well as other desktop support.

Voice: 505-665-4444 option 5
FAX: 505-667-5304
E-mail: desktop@lanl.gov, mac-help@lanl.gov, or pc-help@lanl.gov



Training, Development, and Coordination Team: (back) Vicki Brown, Susan Simonsic, Leslie Linke, Mary Lou Holmes, (front) Beverly Faulkner, Lisa Gardner, and Nikki Watson

1.5.7. External Computing

This organization provides administrative support to external users.

Voice: 505-665-1517
FAX: 505-667-5304
E-mail: external_computing@lanl.gov

Administrative support for external users is also provided for the Accelerated Strategic Computing Initiative (ASCI).

Voice: 505-667-0261
FAX: 505-667-5304
E-mail: jeanne@lanl.gov



Customer Support and Desktop Consulting Teams: (back) Susan Trujillo, Joyce Sandoval, Amy Meilander, Bobbie Jo Lovato, Judy Pippin, (front) Weldon Scoggins, Moses Gallegos, John Lucero, and Geary Radcliffe

1.5.8. Network Operations Center (NOC)

For network problems, you should call the NOC, 667-7423. If you are uncertain that you have a network problem, call the CSC at 665-4444. The NOC manages the LANL open Internet, diagnoses and repairs LAN and data communications problems, and is the main point of contact for network customer service. The NOC maintains the host-name-to-address database domain name system (DNS) and other network information services.

The NOC is staffed with technicians who will resolve problems over the phone if possible. The NOC will also dispatch field technicians if required. The NOC implements emergency corrective maintenance if multiple users are affected (trouble ticket escalation). The NOC is staffed from 7:00 a.m. to 5:00 p.m. Monday through Friday and also provides after-hours and weekend on-call technician support.

Voice: 505-667-7423 or after-hours dispatch 667-4585
E-mail: nst@lanl.gov
Trouble ticket logged by E-mail: noc@lanl.gov



External Computing Team: (L to R) Jeanne Brueggeman, Lori Kelley, and Ann Dingus

Computing/CIC Organizations/
Organization/ CIC-5 Network
Engineering/Network Support



The hostmaster adds, changes, and removes information about computers on the LANL networks kept under DNS.

Voice: 505-667-7423

E-mail: hostmaster@lanl.gov

<http://www.lanl.gov/icnn/>



1.6. Integrated Computing Network News (ICNN)

The ICNN is designed to support and improve two-way communication between the people in CIC Division who support scientific computing services and our customers who use and pay for these services. This Web site and suite of tools provide important information to the user community and allow the users in turn to enter comments, questions, problems, etc., into the system. CIC-Division has developed the ICNN in close coordination with X-Division in order to ensure that the features included are important to the user community and of practical value.

ICNN is intended to be a living tool in that it will evolve and change according to user requests and the changes in our computing environment. It is intended that this site extend and clarify communication among ICN users and maintainers in a way that is truly beneficial to all involved.

If you have suggestions, comments, complaints, or complements regarding this Web site and its associated functionality, please don't hesitate to let us know! Please send e-mail to icnnfeedback@lanl.gov with your ideas. We appreciate your input and will endeavor to make this site meet your needs as best we can.



2. DETERMINING NETWORKING REQUIREMENTS

The ICN is an important tool in accomplishing the Laboratory and DOE goal of electronically linking all employees. Full participation in research, development, and administrative activities will increasingly require the kind of electronic access the ICN and the Internet make available to Laboratory employees, associates, and contractors.

The ICN is connected to the Internet, a worldwide collection of computer networks whose users can communicate with each other using a variety of networking applications. If your workstation is a part of the ICN, you can, for example, access remote computer resources, order supplies, access airline schedules, or use the “Information Superhighway” (Internet) to perform a variety of other activities. If you need Internet or ICN access, the following questions must be addressed.

2.1. What Type of Workstation Is to Be Used?

There are three primary types of personal workstations that are supported at Los Alamos: PC (and PC clone), Macintosh, and UNIX-based workstations (Sun, SGI, etc.). Call your group office or the CSC (665-4444) for assistance in determining what type of workstation is best suited for your environment and applications.

2.2. What Types of Communication Links Are Available?

There are several types of communication links that may be used to connect to the ICN. Your specific work area may limit your selection. However, depending on the types of applications that are required, you may elect to have upgraded communications installed. Call the NOC at 667-7423 for assistance in determining what communication is available. CIC-5 can also help you select an appropriate modem if you need a dial-up connection. Table 2.1. describes the primary communication links.

Table 2.1. Type of Communication Link

| Link | Data Rate | Description |
|-------------------------------|-----------|--|
| LAN | 10/100 MB | Provides a direct high-speed link (TCP/IP) to the ICN/Internet [see Table 2.2.] |
| ISDN | 57.6 kB | Access the ICN/Internet via Lab phone links to the TIG. Your workstation must use an appropriate emulator [see Table 2.2.] |
| Telephone Dial-up Link | 56 kB | Access to the ICN/Internet via common carrier (U S West, etc.) to LANL Dial-up Modem Service. Your workstation must use an appropriate emulator [see Table 2.2.] |

2.3. What Communication Hardware/Software Is Needed?

Depending on the type of communication link chosen, your workstation may need the software identified in Table 2.2. Your local computer person or CIC-2 (667-5355) can assist you in selecting, installing, and configuring your network hardware and software.

2.4. What Are the Networking Software Requirements?

With the link established and the networking communication installed, you can use Table 2.3. to identify the software that will provide the functions or resources noted.

Table 2.2. ICN Workstation Communication Requirements

| Type of Workstation | Type of Connection | Communication Link | | |
|-----------------------------------|--------------------|------------------------------------|--|--|
| | | ISDN 57.6 kB | Dial-up ¹ 56 kB | LAN 10/100 MB |
| Macintosh | Serial | VersaTerm Pro | Modem and VersaTerm Pro | N/A |
| Macintosh | PPP | Free PPP or OT/PPP ² | Modem and Free PPP or OT/PPP | Ethernet Con- nector or Card IP Address |
| Windows 95/NT (PC) | | PPP Serial cable | Modem and Serial cable | Ethernet Card IP Address |
| UNIX Platform (Sun, SGI, etc.) | TCP/IP (Ethernet) | N/A | Modem PPPD and Chat ³ | Standard Hardware and Software Connectivity |

¹ Refer to the following URL for more information: <http://www.cic-5.lanl.gov/csc/modems.html>

² (open transport/point-to-point protocol)

³ Software program that automates the log-in procedure to a PPP server.

Definitions for “Type of Connection”

Terminal (Serial)—A relatively slow link that employs terminal emulators to pass data one character (byte) at a time.

PPP—Allows ISDN and dial-up connections to work with ICN/Internet protocols. When used, they connect to the ICN through the LANL Dial-up Modem Service, a special entry point that allows you to perform functions (Telnet/FTP) and applications with Internet hosts.

TCP/IP—Protocol that is typically used as the primary method of communications for Ethernet LANs.

2.5. What Are the Resource Access Requirements?

To access the ICN computers and resources, you will need to have a variety of requirements fulfilled as noted in Table 2.4. Call the CSC (665-4444) for assistance in determining what requirements you need to access specific resources.

Table 2.3. Workstation Networking Software Requirements

| Type of Workstation | Function or Resource | Required Software |
|---------------------------|----------------------|--|
| Macintosh | Telnet | National Center for Supercomputer Applications (NCSA) Telnet |
| | FTP ¹ | Fetch |
| | 3270 Emulator | TN3270 (requires Mac TCP/IP installed) |
| | POP | Eudora |
| | PAGES | MacPPAGES or Appletalk Zone & PAGES software |
| | WWW | Netscape 4.0 or Internet Explorer |
| | SSH ² | Data Fellows |
| | Kerberos | Cygnus |
| Windows 95/NT (PC) | Telnet | (Windows 95/NT) Microsoft Telnet.exe |
| | 3270 Emulator | WTN3270 or QWS 3270 |
| | FTP | FTP |
| | POP | Eudora |
| | PAGES | PAGES software & net access to PAGES |
| | WWW | Netscape 4.0 or Internet Explorer |
| | SSH | Data Fellows |
| | Kerberos | Cygnus |
| UNIX | Telnet | Telnet |
| | FTP | FTP |
| | 3270 Emulator | X3270 |
| | POP | Netscape 4.0 |
| | PAGES | PPAGES |
| | WWW | Netscape 4.0 |

¹ file transfer protocol

² secure shell

Table 2.4. Resource Access Requirements

| Application Resource | Access Limited By¹ | Authentication (Kerberos)² | Password³ Required |
|--------------------------------|--------------------------------------|--|--|
| IA (EIA⁴) | Authorities | yes | Passcode from open environment. Passcode or ICN password from administrative environment. |
| IB (EIA) | Authorities | yes | ICN password or passcode if accessed via IA. Passcode if accessed directly via TN 3270. |
| Client-Server (EIA) | Authorities | yes | Passcode from open environment. Passcode or ICN password from administrative environment. |
| Web-based (EIA) | Authorities | yes | Passcode or ICN password from open environment. |
| Register | Registration | yes | ICN password or passcode. |
| UNICOS⁵/UNIX | Registration | yes if Klogin fm wkstn | ICN password or passcode. |
| Cluster | Registration | yes if Klogin fm wkstn | ICN password or passcode. |
| POP | Registration | yes | POP password. |
| PAGES | Valid charge code | yes from workstation | no |
| CFS | Valid charge code | yes from workstation | Must have Kerberos ticket first. |

¹ A definition of each access limitation is in Table 2.5.² A description of Kerberos Authentication is found in Section 4.4.³ A definition of each type of password is in Table 2.6.⁴ Enterprise Information Applications (formerly Labwide Business Information Systems)⁵ UNIX-based Cray Operating System

Table 2.5. Description of Access Limitations

| Access Limitation | Description |
|---------------------|--|
| Authorities | The EIA permit each employee to view only selected portions of business files. Greater access can be provided by your group leader or the Labwide Consulting Office. |
| EIS | You must have an entry for yourself to register for ICN resources. |
| Registration | Allows each employee to validate himself/herself on the various ICN resources. |
| Charge codes | The cost distribution codes to which your computing use is charged. Your group secretary should provide this information. |

Note: A definition of each type of password is found in Table 2.6.

Table 2.6. Types of Passwords

| Access Limitation | Description |
|---------------------|---|
| ICN Password | An eight-character string (issued by the ICN password-generation program or the Password Office) that permits access to ICN resources. There are different passwords for each level of computing (open, secure/classified). Must be changed every six months. |
| Passcode | A six-digit number derived from a smartcard that permits access to the administrative partition from workstations in the open environment. Also can be used for access to the open partition. |
| POP Password | An eight character (user selectable) password selected at the time of POP registration. This is not considered a secure password; therefore, the ICN password must never be used for this. |

2.6. Connecting to LANL from Home or Travel

If you are at home or on travel, there are a variety of ways to connect to the ICN, but to take full advantage of ICN services, the minimum connection is PPP over a telephone line. This will give you access to LANL-only services via a LANL Internet Protocol (IP) address. To connect to the ICN with PPP you will need the following:

- Laptop or home computer with at least a 9600 baud modem [see Sections 2.1. and 2.2.],
- Telephone line,
- ICN phone numbers [Section 5.1.6.],
- ICN password or smartcard (if you need access to the administrative partition) [Section 4.2.],
- Installation of TCP applications software (may come with PPP),
- Installation of PPP software [Section 2.3.],
- Configuration of network information for the ICN [Section 4.3.], and
- Establishment of a POP account (to use a POP mail tool like Eudora) [Section 5.2.].

*Computing/
Compute Resources/
Charge Rates*



The following will help you estimate the cost (1998 rates) to connect to the ICN with PPP [see Section 4.5. for more information about cost]:

- ICN password (\$7.00/month)
- Local dial-up (\$0.015/minute)
- FTS800 dial-up (\$0.105/minute)
- ICN POP account (\$12/month). Some groups maintain their own POP service.
- Software (varies)—commercial software, shareware, and freeware are available through Electronic Software Distribution (ESD).
- Modem (\$150–\$400)
- Installation and configuration (varies)—call CIC-2 (7-5355) for software, Halifax (661-0212) for hardware, or your group's computer support staff.
- Smartcard (\$83)—good for four years.

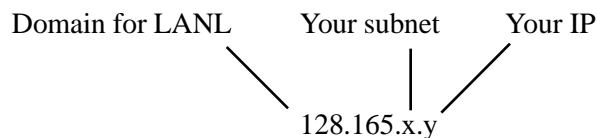
2.7. Network Information to Configure for the ICN

When configuring your PC or Mac for network and e-mail access, you will need the information shown in Table 2.7.

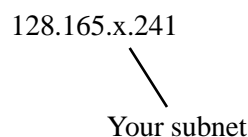
Table 2.7. Network IP Addresses

| Server | Name | IP Address |
|---------------------------------------|-------------------|---------------------------|
| Domain name servers | (use IP address) | 128.165.4.4 192.16.1.2 |
| Network News (news) | newshost.lanl.gov | (use name) |
| Time and Date (Network Time Protocol) | ntp.lanl.gov | (use name) |

LANL IP addresses are configured as follows:



Standard gateway is configured as follows:



2.8. Networking Functions

There are several basic networking functions that permit you to use computing and network resources in remote locations.

- Remote log-ons (Telnet, Kerberos, and SSH) permit you to work through your local workstation (lhost) to a remote host (rhost). Using a workstation windowing environment, you can be logged in to several hosts simultaneously and move between the windows as tasks demand. Refer to the log-in section for information about the log-in process [Section 5.1.].
- File transfer operations (FTP, CFS, NFS, ADSM, Fetch) allow you to move files between a remote host or file server and your workstation. Refer to the file transfer section for information about these functions [Section 5.4.].

While these networking functions are usually performed explicitly, they may be embedded in applications and appear transparent. Some of these functions may not be available unless the appropriate software has been installed on your workstation. Additional network applications include e-mail [Section 5.2.] and the WWW [Section 5.5.].



3. DESKTOP HARDWARE AND SOFTWARE

*Computing/CIC Organizations/
Organizations/CIC-2 Desktop*



3.1. Desktop Administration

The Desktop Group (CIC-2) provides desktop (PC, Mac, and UNIX), server, and LAN administration for Laboratory customers. We also sponsor a project to apply emerging desktop technology to improve effectiveness and value of Laboratory desktops and LANs. You can reach CIC-2 at 667-5355.

Several Web pages of particular interest to desktop users are as follows:

- CIC-2 Homepage—provides contact information and a resume of services (<http://desktop.lanl.gov>).
- Electronic Software Distribution (ESD)—the Laboratory source for software (<http://esd.lanl.gov>).
- LANL Information Architecture (IA)—desktop hardware and software standards (<http://www.lanl.gov/ia>).

CIC-2 Provides two types of desktop and LAN support for LANL customers. We offer dedicated desktop and network administrators to operate the departmental computing environment for customers on a “Form B” basis. For those customers that do not require dedicated support, we offer as-needed system administration services on a recharge basis.

*Computing/CIC Organizations/
Organizations/CIC-2 Desktop/
REDI Project*



CIC-2 sponsors the Remote Electronic Desktop Integration (REDI) project. This project is researching and developing better ways to manage desktops, servers, and LAN systems. The project has two primary focus areas; ESD and SMS. ESD is the Electronic Software Distribution service for the laboratory that allows LANL desktop users to purchase, register, and electronically download or mount software for installation on their computer. SMS is Microsoft software that allows system administrators to automate many desktop management tasks such as hardware and software inventory, automatic unattended installation of software, and remote management and troubleshooting of desktop systems. By leveraging the IA standards and utilizing emerging commercial software, the REDI team is developing the ability to reduce the total cost of ownership for LANL desktop systems while substantially increasing the value of these tools for the end user.

*Computing/
CIC Organizations/ Organization/
Information Architecture Project*



3.2. Desktop Software Standards

The LANL IA Project has published a set of software standards for use on all LANL computers. These standards include minimum and recommended hardware specifications for PC, Mac, and UNIX systems. There are software standards specified for the operating system and versions, e-mail clients, Web browsers, file transfers, electronic documents, virus protection, and more.

CIC-2 has developed a set of support standards designed to facilitate uniform practices and procedures for desktop computer setup, configuration, and end-user support. These standards are intended to guarantee full compatibility and connectivity in the LANL computing environment. They are also designed to

increase support efficiency resulting in decreased total cost of ownership of desktop systems at LANL. For additional information, please look at <http://desktop.lanl.gov>.

3.3. Software Distribution at LANL

CIC makes IA standard software available at reduced prices through the ESD Web site. In addition to the adopted standard software, many other software products and upgrades are available at reduced prices and can be immediately installed from the Web.

Software can be purchased through existing JIT purchasing agreements via the on-line “Stores” system. Finally, software can be accessed from various LANL and public software archives such as the /user/lanl/ NFS server (kufssa).

3.3.1. Electronic Software Distribution (ESD) Web Site

Order desktop software and immediately download it to your computer from ESD. You will need a computer with a Web browser installed, an ICN password or smartcard passcode, and a charge code. Access ESD at <http://esd.lanl.gov>. ESD provides services such as software upgrades, returns, and license transfers. To get timely announcements about software and related issues, subscribe to ESD E-mail from the ESD Web site.



*Computing/CIC Organizations/
Organizations/CIC-2 Desktop/ESD*

3.3.2. Just-in-Time (JIT) Software Purchasing

LANL has a JIT software contract for purchasing PC and Macintosh software. There are various ways of ordering software through JIT. The JIT on-line catalog and order form are available on the Web at <http://TIPS-JIT.lanl.gov> (for help with the on-line ordering system, call 5-4444). To order by phone, call BUS-4 (7-8673 or 7-4171) or call C. J. Enterprises directly (672-9435). Information about the software packages themselves is available on the Web.

3.4. Configuring Network Software

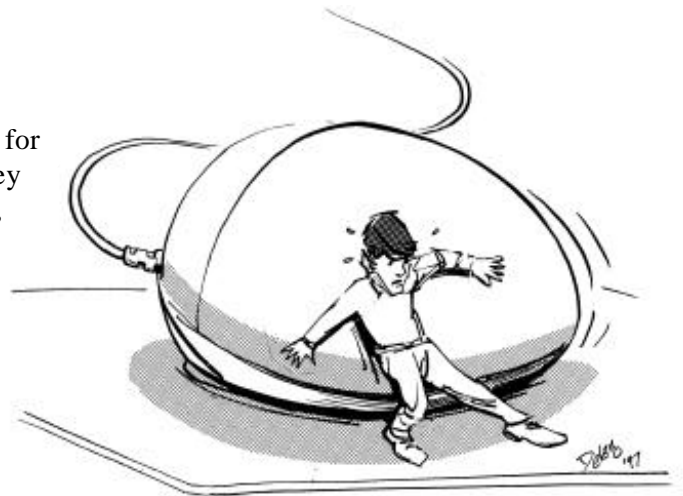
Instructions on how to install and configure networking software for Windows 95/NT and Macintosh computers are available on the Web at <http://c6help.lanl.gov/>.

3.5. Hardware Support

In 1996 the Laboratory partnered with Halifax Corporation for the hardware support of Labs desktop systems. They provide warranty and non-warranty support of PC, Mac, and printers. You can reach Halifax at 661-0212.

3.6. Desktop Phone Consulting

The Customer Service Group (CIC-6) provides phone consulting on many desktop software packages. They can be reached at 665-4444.



4. COMPUTING IN THE ICN ENVIRONMENT

While many users will have only a casual and mostly transparent relationship with the ICN, some aspects of the ICN are important for most Los Alamos computer users to understand.

*Computing/
ICN Validation, Registration
and Changing ICN Passwords*



4.1. Becoming an ICN User—Validation

Because the LANL network is accessible from the Internet, there is a need to protect it from unauthorized use and abuse. Among the several layers of protection is the use of “passwords and/or smartcard” at the user level. By requiring the use of a password, the system can limit access and privilege to different environments and resources of the ICN.

The most common password is the “ICN password” which allows access to the computing and network resources controlled by CIC Division. Access to administrative data that may contain sensitive personnel or business operating data is protected by the use of ICN passwords and smartcards. Personal computers, e-mail accounts, and storage systems may make use of a secondary password.

ICN passwords provide the most security, with different passwords for both the open and secure environments (so you could have two). Additional information on the generation and security of passwords is contained in the section on security [Section 1.4].

4.2. Applying for a Password and/or Smartcard

To apply for a password and/or smartcard to access the ICN, complete and submit an ICN Validation Request form to the ICN Password Office. This form is available from the following sources.

- The ICN Registry (<http://register.lanl.gov>) provides access to a PDF (portable document format) file, which requires Adobe Acrobat to view or print.
- LANL Online Forms (<http://iosun.lanl.gov:7000/dev1/htmls/forms.html>).
- The monthly CIC publication *BITS* [see the back of this issue].
- Group offices.
- ICN Password Office. Call 665-4444 option 1 to have a copy faxed or mailed.

New ICN accounts are created immediately upon receipt of your Validation Request. For faster service, FAX or hand carry the request to the Password Office (TA-3, SM-200, Room 257). You must have either a Q or an L clearance to enter this area.

When you receive a password or smartcard, sign the password/smartcard receipt and return it to the Password Office via interoffice mail (MS B251) or fax (667-9617). Your password and/or smartcard will be activated when the Password Office receives the receipt.



Please read all information included in your password/smartcard packet to be informed on security issues and your responsibilities as an ICN user. There is also information on how to use the ICN Registry for machine validations and e-mail addresses.

4.2.1. Use of Smartcards

A smartcard is a credit-card-sized computer that generates passwords, or in smartcard parlance, “passcodes.” Like a desktop computer, it has a keyboard (the set of keys at the bottom of the card), a screen (the small display window at the top), and a microprocessor, which makes it a “smartcard.”

When you receive a smartcard, it will have a PIN preselected and registered. Each time you key this PIN into your smartcard it generates a new, unpredictable passcode that is valid for one log-in ONLY. The ICN authenticates the passcode based on your smartcard serial number, your PIN, and the time. The small bars to the left of the passcode indicate the time remaining (in ten-second intervals) for the use of each passcode.

The capture of passwords, either as they travel through the network or reside in a system file, is an overriding concern in computer security. With the Internet, this risk has grown enormously. The best defense against this threat is a one-time, disposable password—no more password file to “hack” and no more permanent password to “sniff.”

4.2.2. ICN Password Renewals

ICN passwords must be changed semiannually. You can change your own password for open/administrative computing online—either when the password comes up for renewal or at any time beforehand (if you’re concerned your password may have been compromised or “sniffed”). The Password Office will notify you by e-mail one month before your password expires.

To change your password,

1. Go to the ICN Registry Web site (<http://register.lanl.gov>).
2. Choose “ICN password/smartcard” and follow the prompts.
3. Fifteen passwords will be displayed. Decide on the one you want, and enter both current and new passwords at the prompts. When you select a password, it goes into effect immediately, and your expiration date is moved forward six months.

Thirty days before a LANL user's secure/classified password is due to expire, the Password Office sends that user a memo indicating that it is time for renewal. If the user has an encrypted line, the password can be changed on-line as explained above. If the user does not have an encrypted line, he/she must go to the Password Office to pick up a new password. Renewals for non-LANL users are mailed to their classified mail channels. These mailings indicate the new password and include a receipt that must be signed and returned to the Password Office before the new password is activated.

Users have thirty days to change their passwords. Reminder notices are sent to users at ten-day intervals until the password is changed. If the password is

not changed within the thirty-day time frame, the account is closed. To reactivate the account the user must complete a new ICN Validation request and submit it to the Password Office.

4.2.3. Non-LANL Users

LANL also allows non-LANL people to use the ICN. Computing services are generally available, for a fee, to other government agencies. Otherwise, you must be working in collaboration with LANL employees.

If you are not a LANL employee, and you want more information about obtaining an ICN account, call the External Computing Office at (505) 665-1517 or send e-mail to external_computing@lanl.gov.

4.3. Registering for ICN Resources

To use specific ICN resources such as e-mail or compute servers, you must be a registered user. The ICN Registry Web site (<http://register.lanl.gov>) provides a centralized registration function. After receiving your password or smart-card, you can use the ICN Registry to do the following:

- Change or delete your ICN password.
- Set up or make changes to accounts on ICN compute and file servers.
- Create a new e-mail address or make changes to an existing one.
- Create a new mailing list or make changes to an existing one.
- Access the Recharge System to set up or modify charge codes for specific ICN services.
- View a table showing all your ICN accounts, names, e-mail addresses, etc.

Within the ICN Registry you may own several names. You may define an e-mail forwarding address and World Wide Web (WWW) URL for each name. Some names have special properties:

- Published name—This name will appear in your LANL phone book listing.
- All your other names (aliases) inherit the published name forwarding address if a forwarding address is not explicitly defined; e-mail to these names will work but will not show up in the phone book listing.
- Log-in/User name—This name is associated with the UID (UNIX user identifier) number; UNIX accounts such as the Cluster and Cray accounts will be created under this name, which must be 8 characters or less.

4.4. ICN Authentication—Kerberos

To use some ICN resources such as the supercomputing facilities or the CFS, you must identify yourself with your Los Alamos log-in name and ICN password. This process uses the Kerberos authentication facility in which the ICN password is never passed over the network in clear text.

Kerberos verifies your identity when you try to access different ICN resources. It does so through the use of tickets. The ticket allows you to perform many

functions such as logging on, executing shell commands, copying files, and retrieving files. These actions can all be performed on remote hosts without the need to send the ICN password across the network.

Kerberos commands mimic most UNIX commands except that they start with a "k." For example, you can "klogin," "kcp," "krsh," etc. You must first request a Kerberos ticket before using any of these features by issuing the "kinit" command. The "klist" and "kdestroy" commands will list and destroy all Kerberos tickets respectfully.

Use of Kerberos involves several important points:

- Kerberos tickets expire after ten hours and may need to be renewed. Existing connections are not affected when tickets expire.
- Kerberos authentication is global, affecting all current and future sessions. If you authenticate yourself in one window, the authentication may affect all windows. If in doubt, you can always use the "klist" command to verify the active Kerberos authentication.
- The k-commands are used to connect your workstation to ICN resources (such as UNICOS). They do not work from UNICOS to your workstation or between local workstations.

Once you access a resource (such as UNICOS) with a Kerberos command such as "klogin" and you are "authenticated," there is no functional difference between that command and the standard UNIX r-command. The k-commands transparently authenticate and are considerably more secure than standard r-commands.

4.5. Charging Policy for ICN Use



*Computing/Compute Resources/
Charge Rates*

Charges are incurred for some CIC services, which include the following:

- UNICOS and Cluster CPU (central processing unit) time, input/output (I/O), and memory use (dependent on the specific system used).
- ICN dial-up communications (including 800 service).
- CFS service charges (dependent on file storage activity and output device).
- PAGES charges (dependent on output activity and output device).
- E-mail accounts.

Most ICN resource charges you accumulate are assigned to the default code defined in the Recharge System (<http://recharge.lanl.gov>). This code consists of a cost center, program code, cost account, work package, and occasionally a voucher ID. For example: 8J0900 W123 0000 0000. The cost center usually relates to your group, while the program code, cost account, and work package identify the specific project.

Your ICN charges for a given period can be displayed by accessing the Data Warehouse (<http://datawarehouse.lanl.gov>).

Use the Recharge System (<http://recharge.lanl.gov>) to change charge codes.

5. COMMON COMPUTING RESOURCES AND SERVICES

5.1. Logging-in to Remote Computers

Remote log-ins allow you to log in to another computer from your lhost, executing programs and accessing services as though you were sitting at that rhost. (Networked computers are often referred to as “hosts” in much of the supporting documentation). The log-on process may differ depending on the type of workstation being used and the method of connection. The following is a description of some of the log-on methods currently available: TCP/IP connections using Telnet, “rlogin” or “klogin,” and dial-up type connections using terminal emulators.

5.1.1. Telnet Log-on

Use Telnet to log on directly to TCP/IP hosts:

```
telnet [rhost]
```

where rhost is the remote host name. The following is a sample log-in session.



```
% telnet host name
Trying 128.165.220.1...
Connected to host name.lanl.gov.
Escape character is '^]'.

Cray UNICOS (host name) (ttyp007)

login: abc
ICN Password or Passcode [012345]: (echo suppressed)
Last successful login was : Wed Feb. 28 12:46:47
from abc.lanl.gov
Logon Compartment = NULL
.
.
.
host name%
```

If the Telnet command is used without arguments (or fails to make the desired connection), it enters the command mode, shown by the prompt TELNET>. Enter “exit” or “logout” to disconnect the telnet session.

5.1.2. Terminal Internet Gateway (TIG)

The TIG permits access to Internet hosts from terminals via dial-up connection at (505) 667-9020 or (800) 443-1461. To log in via dial-up, select the appropriate number and respond to the prompts.

At the “tig>” prompt, you can make connections to a host by simply entering the name of the host or by entering commands to the TIG. When finished using the TIG, log off the host, then log off the TIG with “exit.” The TIG also terminates any connection after 30 minutes of inactivity.

5.1.3. Remote Log-in—K5rlogin

“K5rlogin” uses Kerberos tickets obtained with a “k5init” command, which is used on most servers. Therefore, when you use “k5rlogin,” there is no request for a password.



<http://saaz.lanl.gov/kerberos.html>

5.1.4. Remote Log-in—Klogin & Ktelnet

To log in with either klogin or ktelnet, first obtain a Kerberos ticket with the “kinit” command and your ICN password. You can then use “klogin” or “ktelnet” to login to machines without being prompted for a password. “Klogin” is only available for UNIX. “Ktelnet” is available for Mac and Windows. All Kerberos software is available from ESD.

5.1.5. Remote Log-in—SSH

You can also use SSH to log in. If you are using UNIX and have run “kinit” first, SSH will not prompt you for a password; otherwise you will be asked for your password on the remote machine. SSH for UNIX is included with the UNIX Kerberos distribution on ESD. The Mac and Windows versions are available separately on ESD.

5.1.6. Dial-up into ICN Using OT/PPP and Free PPP

OT/PPP and Free PPP allow you to sign onto the ICN from a telephone line (with a modem) and proceed as if you were on LAN connection. You can then send files via FTP, connect via Telnet to a variety of remote hosts, and use client/server applications such as Eudora. Before attempting to use OT/PPP or Free PPP, you must configure it properly. Call the CSC at 665-4444 for assistance.



<http://reggie.lanl.gov>

To use PPP, you need a telephone line, a Mac or PC with a modem (1200 to 5600 baud rate), and the appropriate software [see Table 2.2.].

5.1.7. How to Use PPP from a Mac

To use PPP from a Mac, proceed as follows:

1. Run OT/PPP or Free PPP.
2. Click “Connect.”
3. Enter your ICN user number and password when prompted.
4. Everything is automated. Do not type in the “Status” box. This box shows you what is automatically happening, such as getting your IP address.
5. To disconnect, click “Disconnect.”

To verify that the PPP connection is active to the ICN, select your OT/PPP or Free PPP control panel and read the prompt.

5.1.8. Blacklisting Messages

During the log-on process, if you enter your password incorrectly and press <RETURN>, your log-on will not be accepted, and you will see the following message:

“Access denied” or “login incorrect”

If this occurs ten successive times within 5 minutes, or if you “successfully” log in 10 times within 5 minutes, your user number is blacklisted by the ICN. A successful log-on resets the invalid password counter to zero.

If you attempt to log on after seeing the above message, the log-on will be rejected by the ICN, and you will see the following message:

“Permission Denied”

If you think you have been blacklisted, call the ICN Password Office at (505) 665-4444 option 1.

*Computing/Network Resources/
Breaking Network Connections*



5.1.9. Breaking a Hung Log-in Session

It is often difficult to know just when or why your computer screen might freeze. Is it the application? The host computer? The network? Your own desktop? Sometimes the cause is one of these, but often it’s a combination. Whatever the problem, it has brought your ability to use your computer to a frustrating halt. Often your main concern isn’t determining what went wrong; rather, you want to know how to get out of your current unproductive predicament.

If the appropriate break sequences don’t revive your computer/terminal, you may need to reboot your system or kill the window that’s locked. Machinery that freezes often and consistently probably needs troubleshooting. Ask your local system administrator for help in determining the cause.

5.2. Electronic Mail (E-mail)

5.2.1. Concepts and Etiquette

Use e-mail to exchange information with other users over networks such as the Internet (open partition only). Although e-mail appears instantaneous,

- Messages may not be immediately posted to a recipient,
- The recipient may not be logged on to the system, or
- The recipient may be busy with other tasks.

To use the e-mail system effectively, choose your words carefully, and

- Log on at least once each day to read your mail,
- Compose single-subject messages whenever possible,
- Define an appropriate “subject” line (avoid using “FYI”!),
- Assume that any message you send is not secure and will live on indefinitely,
- Know who your intended audience is and establish an appropriate level of formality,
- Keep the list of recipients and “CCs” to a minimum,
- Identify yourself and your affiliations clearly, and
- Know when NOT to use e-mail; consider face-to-face, phone, or paper.

Most e-mail systems communicate using character sets (a text-only character format). If you must send binary data or formatted data (such as Microsoft Word), encode the message with Mime before sending it. Some mail readers

cannot process these types of files. Avoid sending anything but ASCII files unless you know that your recipient can handle them.

Insert carriage returns every 60 characters or so. Don't depend on your terminal hardware carriage return to generate new lines—it probably doesn't.

5.2.2. Functionality

The following functions are available in most e-mail systems:

- Receive and read mail;
- Create and reply to mail;
- Save, delete, or hold incoming mail;
- Establish distribution lists;
- Forward e-mail to others;
- Assume an alias (log in as a guest) to another account;
- Provide travel/vacation advisement; and
- Find e-mail addresses.

5.2.3. Forwarding E-mail

All supported mail services allow mail to be forwarded to another address. You may have several systems on which you can receive mail but one that you prefer to read and log your mail. You can establish a forwarding flag on each of the systems on which you do not want to read mail.



*Computing/Electronic Mail/
Introduction to E-mail/
Forwarding E-mail*

5.2.4. Sending Attachments—Document Conversion

E-mail attachments allow people to easily share formatted files such as graphics, spreadsheets, and documents across different platforms and across the globe more easily than ever before. However, there are problems associated with such transfers.



*Computing/Electronic Mail/
Introduction to E-mail/
E-mail Document Conversion*

E-mail travels in ASCII format. When you need to send a formatted document, such as Word, it must be encoded. Mime is the primary encoding scheme and should be used in all cases.

When you attach a file to an e-mail message, the Mime encoding scheme in your mail program converts the file to ASCII format. When your e-mail arrives at its destination, the mail package on the other end converts your attachment back into the original format.

A complete description of what facilities are available for sending attachments is on the Web along with suggested notes of etiquette.

5.2.5. Choosing an E-mail Service

POP and UNIX e-mail services are supported at Los Alamos. The choice usually depends on the type of workstation you use, the network connectivity available, and the e-mail interaction you have with your working group.

CIC offers an Internet account that includes e-mail. You may use the Eudora POP client from your workstation or log in to the server directly using telnet, SSH, or Kerberos [see Section 5.1.] and then run pine or UNIX mail.

When using POP, your e-mail is stored on the POP server until you call for it. You need a TCP/IP connection (LAN or PPP) to use the POP client.

For many users the choice is simply one of personal preference. All of the supported systems can e-mail to each other and to Internet addresses outside the Lab. The following descriptions may help you decide which is best for you.

*Computing/Electronic Mail/
Eudora and POP Servers*



5.2.6. Eudora (POP E-mail Service)

Eudora is a Mac or PC windows mail application that employs icons and point-and-click operations. It communicates with an SMTP (simple mail transfer protocol) server to download your mail from a POP server to your Eudora client. Both LAN and dial-up connections may be used to connect to the POP server where your mail is stored until you call for it. A local Eudora password is used that can be changed by you. A complete set of instructions for using Eudora is on the Web.

Considered easy to use, there are several different POP servers that provide varying levels of features including local POP servers that may be established by LANL organizations with similar capabilities.

To use Eudora you must install the Eudora client software for your Mac or PC. It is available from ESD or can be purchased from the JIT vendor. The software must be configured to communicate to a selected POP server.

ICN POP accounts are available through the ICN Registry or by calling the CSC at 665-4444.

The commercial versions of Eudora have a number of added features not found on the freeware version, and they come with a manual and free technical support from the vendor, Qualcomm.

POP servers use a special password (not your ICN password) that is defined at the time your account is established. It can be changed using the ICN Registry or from within Eudora itself. For assistance call CIC-6 (665-4444). Eudora is the Laboratory's e-mail software standard as defined by IA.

Vacation Message for E-mail

Like voice mail, you can "display" a reply vacation message to incoming mail senders. The vacation message will inform senders of your out-of-town dates. Call CIC-6 (665-4444) or send e-mail to cichelp@lanl.gov for assistance with the setup and activation of a generic or custom message on your behalf. The vacation e-mail will be sent to anyone that sends you e-mail. No replies are sent to distribution lists (e.g., cic-all@lanl.gov).

Using Pine on a POP Server

When you don't have access to a workstation that has Eudora, or you can't make an appropriate network connection (PPP), you can still read your mail if you can connect via telnet, k5rlogin, or SSH to the POP server.

Example: `tig> telnet pobox1663`

Log in to the server using your ICN Log-in/User number and ICN Password/Passcode. At the machine prompt (a % sign) enter the following command to identify the type of emulator you are using (typically a vt220):

```
setenv TERM vt220
```

Next, enter the command “pine.” You will be presented with a series of menus that will permit you to access virtually all of the mail functions.

Configuring Eudora

To use Eudora, you must be sure that it is properly configured [see Table 5.1].

Table 5.1. How to Configure Eudora

PC Eudora 3.x

1. Select “Tools” and “Options” from the menu bar.
2. From the “Getting Started” category,
 - Enter your POP Account:, (e.g., u012345@cic-mail.lanl.gov)
 - Enter your Real Name:, (e.g., John Doe)
 - Enter your Return address: (e.g., Doe_John@lanl.gov)
3. From the “Hosts” category,
 - Enter POP Account
 - Leave SMTP blank
 - Enter Ph: ph.lanl.gov
 - Enter Finger: finger.lanl.gov
4. From the “Checking Mail” category, check for mail every 10 minutes.
5. From the “Attachments” category, specify a directory location by mouse-clicking on the shadowed bar. (e.g., c:\eudora\attach)
6. Click “OK” to save from the Options... Window.
7. Quit and restart Eudora for changes to correctly take effect.

Mac Eudora 4.x

1. Select “Special” from the menu bar.
2. Select “Settings” from the menu.
3. From the “Getting Started” category,
 - Enter your name (e.g., John Doe)
 - Enter your user/login name (e.g., u012345)
 - Enter mailhost (e.g., pobox1663.lanl.gov)
 - Enter return address (e.g., john@lanl.gov)
4. From the “Host” category,
 - Enter Mail: pobox1663.lanl.gov
 - Leave SMTP blank
 - Enter Directory Services: ph.lanl.gov
 - Enter Finger: finger.lanl.gov

5.2.7. Registering Your E-mail Address

If your e-mail account is on a central Lab e-mail server, your e-mail address was registered automatically at the time the account was set up. If your e-mail account is on another e-mail server (e.g., your group or division e-mail server), you must register your e-mail address yourself using the ICN Registry.

Registering your e-mail address has advantages. First, it allows you to create an e-mail address in the form “user@lanl.gov.” This allows people to send e-mail to



*Computing/Electronic Mail/
Electronic Mail Registry*

you (@lanl.gov) without having to know specifically where you receive mail (the name of the e-mail server). For example, mail sent to fred@lanl.gov may actually be delivered to flintstone_frederick@bedrock.lanl.gov. If your actual e-mail address changes, you need change only the registration—there is no need to notify others of such changes. Second, it allows people to use the Web Phone Book, Finger, or Ph utilities to find your e-mail address.

To register your e-mail address follow the instructions below.

1. Go to the ICN Registry (<http://register.lanl.gov>).
2. Choose the e-mail option.
3. At the e-mail menu, choose “Create new lanl.gov address” and follow the instructions.

Selecting an E-mail Name

An e-mail name can be something like abc, jsmith, or esalazar3, or martinez_john_a, or david.adams. The e-mail name must be unique. (see Section 4.3.1)

Forwarding Addresses

The forwarding address is where mail, sent to your_address@lanl.gov, will be delivered by the central LANL mail server. It will generally look like

username@machine.lanl.gov

such as

u012345@pobox1663.lanl.gov (a typical POP server mail address)

When Albert Casey registers abc as his e-mail name and u012345@pobox1663.lanl.gov as his forwarding address, he creates an e-mail address of abc@lanl.gov, which forwards mail to his account on pobox1663.

The ICN Registry can also be used to shorten or simplify an e-mail address.

Secondary Names and Lists

You may register other names and distribution lists on the ICN Registry. Secondary names are other e-mail names by which you may receive e-mail.

5.2.8. How to Change Personal Information

The personal information that appears in the ICN Registry and the Lab phone book is taken from the EIS database. Changes to this data can be made only through the EIS. Individuals requiring changes in their personal information should contact the person designated by the group leader as responsible for the group’s EIS entries (usually your group secretary).

5.2.9. Finding E-mail Addresses

When attempting to send mail, you may not know the e-mail address of the intended recipient. To find basic information about a user, you can use one of the following tools: Finger on UNIX, Ph and Finger on Eudora, the LANL Phone Book via Netscape, and LDAP (lightweight directory access protocol) via Netscape.

<http://www.nic.lanl.gov/dir/ldap>



Using Finger

If you have access to the Finger command on your system, you can use it to access the phone book to search local and most remote sites for users who satisfy a variety of criteria.

This finger command lists all records that begin with “casey,” including people with “casey” as first name, last name, or any name that starts with these letters. Note that two of those on the example below do not have registered e-mail addresses.

```
% finger casey@lanl.gov

012345 Casey Albert B. CIC-6 B251 505-667-7298
abc@lanl.gov
080330 Casey Hugh MST-6 G770 505-665-4719
hcasey@lanl.gov
113162 Casey Nancy N. CIC-3 B265 505-667-7028
114413 Olson Casey D. BUS-1 C121 505-667-1212
```

More information is available from the “long listing” (UNIX “-l option”) as shown below.

```
% finger -l casey@lanl.gov

      name: B. Albert Casey
      znumber: 012345
      e-mail: abc@lanl.gov
      forwarding addr: u012345@cic-mail.lanl.gov
      phone: 505-667-1234
      fax: 505-667-6333
      organization: CIC-23
      postal address: MS B294
      location: TA-03 Bldg 0132 Room 534
```



*Computing/Electronic Mail/
Finding E-mail Address*

To qualify the search, you can use the first name and encase the string in quotes.

```
finger "jose martinez"@lanl.gov
```

Additional information is available by entering `finger help@lanl.gov`.

Using the Eudora PH/Finger Client

Some systems, like the Eudora mail package, contain a Ph program that has a “point and click” interface. Note that instead of returning a single line of information, the Ph or look-up program always gives you the long listing of information for each person, and the Finger program provides a short list of information.

Using Web Phone Book

The Web Phone Book application is available from the LANL Home Page. Two options are available, a short query form and a more comprehensive query form.



Phone

Computing/Electronic Mail/
Distribution Lists



5.2.10. Distribution Lists

Two applications are available to establish e-mail distribution lists. For more information about these applications, call the CSC at 665-4444 option 1.

- Listmanager—permits you to create and maintain your own distribution list on the Lab mail host. These lists are “public,” which means anyone on the Internet can mail to them.
- JIT-list—permits you to distribute e-mail based on demographic characteristics found in the EIS database. For example, users could send E-mail to all the people in a particular Laboratory building or group.

Computing/CIC Organizations/
Organization/CIC-17 Media/
PAGES



5.3. Hard Copy Output—Print and Graphics Express Station (PAGES)

PAGES provides a variety of printing services available through electronic access via the ICN. You can order any PAGES print service without leaving your office if you have a computer connected to the ICN and the proper PAGES access tools. These tools are now available for Macs and PCs as well as UNIX machines.

In most cases PAGES can complete your print job the same day or even within hours. Print jobs can be delivered to your mail stop or distributed to on-site locations per your instructions. Your documents are available for pickup in TA-3, in the concourse of Building 132, the CCF. With PAGES you can print to a variety of media including the following:

- 35-mm color film (slides),
- 36” color plotter,
- 8.5” x 11” black and white paper,
- 8.5” x 11” color paper or transparency,
- 8.5” x 11” color photo or transparency,
- video (VHS, 8 mm, or U-matic), and
- 105-mm microfiche.

5.3.1. UNIX/VMS Output—PPAGES

The command “PPAGES” sends a variety of file formats such as ASCII text or PostScript to the PAGES output facility for printing on paper, transparencies, or microfiche. PPAGES uses the command “LPR” (line print request) to transfer print jobs to PAGES. Most of the LPR, “LPQ” (line-printer queue), and “LPRM” (line printer/remove files) features are available, but they apply only to print jobs being transferred to PAGES. After a job is accepted by PAGES, call the CCF dispatcher for its status (7-4584).

The PPAGES command requires the specification of the file type and format (see example below). Numerous other options are available (see the “man” page).

```
ppages -ft value -format fmt filename
```

If you do not list any options, PPAGES will assign default values for the format you entered.

PPAGES uses the Kerberos authentication process to validate your print request. You must use the “kinit” command before attempting to send output to PAGES.

PPAGES needs your Z-number and ICN charge code before the job can proceed. It passes the values of the “environment variables” called “ICNZ” and “ICNCHARGE” to PAGES for accounting and to look up the user’s delivery destination. Thus, you must have a valid charge code established.

5.3.2. Macintosh Output—PAGES and MacPPAGES

If you are a Macintosh user, there are two ways to print to PAGES. You can use PPAGES for Macintosh (the “normal” way) or MacPPAGES. PPAGES for Macintosh creates and ships files to PAGES in a single-step process. This is generally preferable; however, you must have AppleTalk capabilities to use PAGES with the “native” Macintosh operating system.

To determine if you have a direct AppleTalk connection to PAGES, open the chooser and verify the AppleTalk zone list for a zone entitled “PAGES.” If the “PAGES” zone appears, you have a direct AppleTalk connection to PAGES services. Otherwise your Mac is not connected to a network, or AppleTalk is not routed from your network to PAGES. Contact your local system administrator, who may be able to install the PAGES zone.

Assuming you have network access, you must install LaserWriter 8 (you probably already have it) and a set of PostScript printer description (PPD) files for the PAGES devices. These are available on-line in the form of an installer program.

If the “PAGES” zone is not available, you must use MacPPAGES. MacPPAGES is a Macintosh file shipper that manages a variety of formats. Unlike native Macintosh operating system programs, MacPPAGES uses a two-step process to print to PAGES. First select or create a PostScript file, then ship that file to PAGES using MacPPAGES.

5.3.3. Microsoft Windows Output—PPAGES

For Microsoft Windows, the best methods for accessing PAGES services are listed below in descending order.

- Use the Adobe PPD, version 2.1 or later. Like the native Macintosh operating system graphical user interface (GUI), this driver can create and ship files in a one-step process. For detailed instructions on downloading and installing, refer to the documentation in HTML or PDF 1.1MB format.
- Use PPAGES for DOS.
- Use LPR for DOS.

The second and third methods are command-line interfaces.

5.3.4. MS Windows Requirements

To use PAGES from your Windows PC, your PC must be on the open network. You will need to install Adobe’s PostScript printer driver for Windows and set up the PAGES devices as network printers. An archive file is available on-line.

5.3.5. Calcomp Printing Services

For large-scale printing, PAGES provides computer-generated monochrome and color drawings via a Calcomp 5835XP electrostatic plotter. This plotter can produce drawings in sizes A through E (8.5" x 11" through 36" x 88") and is capable of creating half-tone or screened color images at 400 dot-per-inch resolution using a 256-color palette and a special dielectric coating. Calcomp allows you to create large color posters, flow charts, electrical/mechanical drawings, and other types of large-scale drawing applications.

5.3.6. Novajet III Printing

This plotter is also capable of producing A- through E-sized color drawings on roll-fed bond paper or Mylar material. The advantage of Novajet is that it provides extremely high-quality monochrome drawings via continuous-tone, or unscreened, images. The Novajet III is about four times faster than the current Calcomp plotter so turnaround time will be vastly improved. The biggest improvement, however, is in quality.

*Computing/CIC Organizations/
Organization/CIC-17 Media/
PAGES/Check on Job Status*



5.3.7. PAGES Job Status Reporting

A Web interface is now available for querying the status of jobs sent to PAGES. This service allows you to see what jobs you have in the queue, when they were printed, what options were requested, etc. You can query by Z-number, job number, or PAGES queue name. This new service can now be accessed on the Web.

5.4. Transferring and Storing Files

Several methods are available to transfer files between computers and file storage. This section will briefly describe the following:

- FTP—Transfer files between Internet hosts,
- HPSS—Store files from high performance computers,
- CFS—Transfer files to permanent storage,
- NFS—Share files between hosts, and
- ADSM—Back up files.

*Computing/Network
Resources/FTP*



5.4.1. File Transport Protocol (FTP)

The FTP facility copies files between IP hosts and offers many options including the ability to delete files, list directories, and change directories on the remote machine. To retrieve a specific file you need the following:

- The name of the remote host (computer),
- An account on that computer (user ID and password), and
- The path name to the file.

The general form of the UNIX command is `ftp remote_hostname`

PCs may use the FTP while Macs will use Fetch and VersaTerm FTP. When the connection is ready to accept FTP commands, the prompt "ftp>" appears.

Anonymous FTP

Anonymous FTP allows limited access rights to information by users who do not have regular accounts on the remote host by using a special account called “anonymous.” The only operations allowed are logging-in using FTP, listing the contents of a limited set of directories, and retrieving files. Anonymous users are not usually allowed to transfer files to the remote site.

Anonymous accounts typically use “anonymous” as the log-in name and the password “guest” or your e-mail address (if it is requested by the log-in prompt).

5.4.2. High Performance Storage Systems (HPSS)

HPSS provides a scalable parallel storage system for highly parallel computers (such as the Origin 2000) as well as traditional supercomputers (UNICOS) and workstation clusters (ONCS—open network computer cluster). HPSS requirements are driven by high-performance computing environments, such as the National Information Infrastructure (NII), in which large amounts of data are generated by massively parallel processors (MPPs) and workstation clusters. Scalability is in several dimensions: data transfer rate, storage size, number of name space objects, size of objects, and geographical distribution. Although developed to scale for order of magnitude improvements, HPSS is a general-purpose storage system.

HPSS may be of interest in situations having present or future scalability requirements that are very demanding in terms of total storage capacity, file sizes, data rates, number of objects stored, and number of users. HPSS is part of an open, distributed environment based on The Open Group's Distributed Computing Environment (DCE) products that form the infrastructure of HPSS.

The parallel storage interface (PSI) is used for accessing the HPSS. The PSI is modeled largely after UNIX file system commands. Using PSI commands, files may be transferred between a client (i.e., a worker machine, or a workstation) and HPSS, and the attributes of files can be displayed and/or modified.

5.4.3. Using the Common File System (CFS)

The CFS is used to store files on a permanent basis. CFS is available from all computing partitions. The following utilities allow you to work with CFS from UNICOS or other UNIX workstations:

- The CFS command utility,
- The Advanced CFS (ACFS) interface which is available only on UNICOS,
- An FTP client, and
- The Kerberos commands kcp and ksh (or krsh).

5.4.3.1. The CFS Command Utility

The CFS command utility is available on all ICN production platforms. It is distributed with the Kerberos software, which can be downloaded from ESD, and is available for most UNIX workstation platforms. UNIX workstations must have the kerberos software installed to use the CFS command utility. To use the CFS command utility from a UNIX workstation, you must first get a Kerberos ticket. The CFS command utility can be run as a “one-line” command (i.e., “cfs list”).



*Computing/CIC Organizations/
Organization/CIC-11 Data
Storage Systems/HPSS*

*[http://storage.lanl.gov/
cic11/hpss.html](http://storage.lanl.gov/cic11/hpss.html)*

*[http://storage.lanl.gov/cic11/
hpss/psi_man.html](http://storage.lanl.gov/cic11/hpss/psi_man.html)*



*Computing/Compute
Resources/CFS*

The CFS command utility can also be run interactively by simply entering the command “cfs.” The CFS command utility supports a wide variety of subcommands and options. Table 5.2. is a summary of the more commonly used commands. Note that before saving any files on CFS, you must create a root directory.

Table 5.2. BASIC CFS Commands

| Function | Typical Command |
|--|--------------------------------------|
| Create root directory with user number as name | cfs create |
| Create named root directory | cfs create/named root |
| Overwrite a CFS file | cfs replace filename |
| Save a new file or overwrite an existing file | cfs store filename |
| Save a new file to another root | cfs save/named root/file |
| Retrieve files | cfs get filename |
| Delete files from CFS | cfs delete filename |
| Turn off delayed delete (24 hours) | cfs delete delay=off filename |
| Recover deleted files marked as “dying” | cfs rescue filename |
| List CFS files and subdirectories | cfs list |

5.4.3.2. Advanced CFS Interface (ACFS)

ACFS is available only on ICN production UNICOS systems. ACFS provides additional “wildcarding” capability, sorting of LIST output, recursive commands (massacre), preprocessing of files before storing, automatic decompression, use of the “ntext” command, and other processing using the “get” command.

5.4.3.3. FTP Client

Normal FTP clients that come with most UNIX workstations and with all production ICN machines can be used to access the CFS. FTP clients that run on personal computers (both Macintosh and Windows) can also be used to access the CFS. The host name to “FTP” is cfs.lanl.gov. The log on is the basis of authentication, and no further authentication is required. If your host operating system supports the Kerberos version of ftp (kftp), then CFS will use the Kerberos credentials supplied to it and not prompt for your user number or ICN password.

From a UNIX or VMS platform, enter the following: “ftp cfs,” your log-in moniker (Z-number, Z-number prefaced with a U, user's initials, first name, last name, or combination thereof, depending on the system), and your ICN password when prompted. You will normally be put directly into your default CFS directory (usually /Z#, i.e., /123456). Then you can use “cd” to change directories to whatever directory you wish and use normal FTP commands (“get,” “put,” etc.) to perform the desired FTP function.

Graphical FTP clients, such as Fetch (Macintosh) can be used to connect via FTP to the CFS. Point the client to the CFS with your moniker and ICN password. As when you use the standard FTP, you will be placed into your default directory. There is one major difference with these types of graphical clients

when accessing CFS versus accessing standard FTP sites: to reference a topic-level directory tree other than your default CFS directory tree, you cannot use the normal GUI point-and-click means. Most graphical FTP clients have a menu option that allows them to change directories; at that option you can type the path to the desired directory.

If that does not work, look for an option that will allow you to issue a typed FTP command. There you enter the command “d=/path” where /path is the full path to the directory (or to the parent directory so that the graphical nature of the ftp client can take over). Many graphical FTP clients (e.g., Fetch 3.0+ and Anarchie) remember all of the directories that you have visited at a particular FTP site, so you can still “point and click” your way around the CFS.

5.4.3.4. Kerberos Commands

With the implementation of Kerberos Version 5 throughout the ICN, secure authentication of users is now possible with standard UNIX-type utilities. The CFS gateways have been modified to accept Kerberos credentials in lieu of the ICN user number and password. Two commands have been made available, “kcp” and “ksh.” The kcp command is used like a standard UNIX “rcp” would be used:

```
kinit tds
kcp cfs:/cfs/roots roots
```

Additionally, CFS requests that do not result in a file transport (i.e., get save replace and store) can be issued through the command ksh:

```
kinit tds
ksh cfs add /081441/temp
```

Where UNIX pipes can be used, they can also be used to and from CFS.

5.4.4. Network File Service (NFS)

The NFS servers offer a storage capability for workstations, desktop computers, supercomputers, and all other computing platforms around the Laboratory. The NFS servers provide a remote UNIX “file system” that looks and acts like a local file system. Projects large and small can utilize this service to provide centrally located files that are available to remotely located desktop computers, workstations, and ICN compute servers (i.e., Crays, Cluster, and Connection Machines).

Employing NFS can reduce disk purchases and your project’s file system administration and set-up problems involving file sharing across multiple computing architectures.

The NFS service includes the following features:

- Daily backups of your data to ADSM in the open or secure environments,
- 24-hour help via pager 104-8290 (to an NFS system administrator) 7 days a week,
- Access for your questions, problems, or suggestions through e-mail (nfs@lanl.gov),
- Economy (\$20 per gigabyte per month—with unlimited access),



*Computing/Compute
Resources/CFS/CFSGW*



*Computing/CIC Organization/
Organization/CIC-11 Data Storage
System/Network File System*

- Server access via fast fiber-optic connections to the LANL “backbone,”
- Server power connected to an uninterrupted power supply,
- Server location in a secured and controlled-area access computer room (CCF), and
- Files up to 2 gigabytes.

Computing/CIC Organizations/
Organization/CIC-11 Data
Storage Systems/ADSM



5.4.5. Adstar Distributed Storage Manager (ADSM)

ADSM is a client/server software product that provides full and selective backup and archival services for client machines such as PCs, Macs, many UNIX-type machines, and NFS file servers. ADSM can back up the client machine automatically according to a schedule requested by the user, or the client can be backed up manually by the user at any time. Initially, ADSM does a full backup of a workstation; thereafter, it copies only those files that have changed since the last backup. A “restore” of a backup at the “file” level can be done at any time, and all file attributes (permissions, etc.) are restored.

To use ADSM, you must first register your workstation with the ADSM server on the Web. To complete registration, you must have your machine’s network node name, your cost code and program code, and your Z-number. You will also be asked to set your own ADSM password for access, to choose one of four automatic backup schedules (6 p.m. to 6 a.m. is the default), to choose when or if you want to be notified that an automatic backup has failed, and to choose who (if not you) should be notified if it has failed. You can also register by e-mail if you provide the necessary information to adsm_help@lanl.gov.

There is a one-time registration fee to pay for the software license from IBM; a monthly service charge, which covers unlimited backups; and a monthly storage fee.

5.4.6. Distributed File System (DFS)

DFS, available in the open and secure partitions, is the key information/data sharing service in a distributed computing environment (DCE). DFS provides a single virtual file system with a single name space across multiple hardware architectures and geographically dispersed DCE cells. It provides a consistent interface for users accessing data in DCE.

Since DCE and DFS provide the security required for sharing data across geographically dispersed domains, DFS has been chosen as the distributed data sharing mechanism for the tri-lab ASCI program.

http://www.lanl.gov/cic/bits/archive/96december/Sara_Mercury.html



5.4.7. Mercury File Transfer Service

The Mercury service provides a command-line interface to copy unclassified CFS files between the open and secure ICN networks.

Before you can push and pull files across networks, you must set up a CFS directory on both the open and secure networks to allow Mercury user number 900544 to read-from and write-to at the time of transfer. We recommend that you create separate directories for file transfers to differentiate files for transfers from those that exist strictly for storage. Once the directories are created, they can be removed or kept for future transfers.

Run CFS interactively from your workstation or from a Cray worker machine. If you are on your workstation, you will need to get a Kerberos ticket with “kinit” to run CFS.

You must get a Kerberos ticket with kinit to run Mercury commands whether you are on a workstation or on a Cray worker machine. The Mercury system depends on Version 5 Kerberos (k5rsh). You can run Mercury only from machines that can execute kinit, which is available on UNIX-based machines including Crays.

Check the Mercury “man page” for detailed usage descriptions and examples of how to transfer CFS files using the Mercury commands “push,” “pull,” “status,” and “mcancel.” The Mercury man page is available in /usr/lanl/man in both the open and secure networks (/usr/local/man on the Crays).

5.4.8. Using HPSS

HPSS is used for archival storage of files and is available in both the open and secure partitions. As of this writing, HPSS is currently in transition from being a system with limited availability in user-friendly status to a widely deployed production-quality storage system. For archival storage, HPSS is expected to eventually replace CFS.

To determine whether HPSS is currently available on your system, visit the HPSS web site at <http://storage.lanl.gov/cic11/hpss.html>. Information on how to obtain an HPSS account and to get the HPSS client and user interface software is also there. Authentication and authorization information is also available. The PSI is the recommended application for access to HPSS. The PSI man pages are located at the HPSS Web site.

PSI is modeled largely after UNIX file system commands. Using PSI commands, files may be transferred between a client (i.e., a worker machine or a workstation) and HPSS, and the attributes of files can be displayed and/or modified.

Commands may be entered on the PSI command line, for example:

```
% psi get MyFile
```

If PSI is started without a command on its command line, it will read commands from standard input (prompting if standard input is the keyboard) until a “quit” or a “control-D” is entered, for example:

```
% psi
```

```
PSI> get MyFile
```

5.5. The World Wide Web (WWW)

The WWW enables anyone to locate on-line information that pertains to his/her particular field of study. The Web provides a suite of functions including the following:

- text retrieval,
- keyword searches,
- FTP file retrieval,
- access to Telnet-based servers,

*Computing/Network
Resources/WWW/
Responsible Use of the Web*



- retrieval and display of graphic files, and
- audio files and media broadcasts.

5.5.1. Responsible Web Use

At Los Alamos National Laboratory, we recognize and value the Internet as a diverse, decentralized, and robust mechanism for publication, communication, and research. We support the responsible use of the Internet and encourage the Laboratory community to make use of modern communications tools such as electronic mail and the WWW. As a national laboratory, we have unique obligations to protect the property and interests of the United States government. In order to promote these goals, we adopt the following guidelines for responsible use:

1. Promote the sharing of information.
2. Protect sensitive and classified information.
3. Use the Internet for official purposes.
4. Demonstrate professional, ethical, and courteous use.

5.5.2. Getting Set Up to Use the Web

The Web can be accessed from browsers such as Netscape 4.0.

It is very important that your workstation have the Telnet feature installed and properly configured. If you are unsure if this capability is available to you, check with your system administrator.

To access the Web you need the following:

- A workstation such as a Macintosh, PC or UNIX platform,
- A physical connection to the Los Alamos network,
- A Web “browser” (Netscape is the IA standard, and site license is available).

Access the Web by entering the browser command “NETSCAPE” (UNIX) or click on the related icon (Mac or PC). Although many functions are intuitive, there is a button on the browser labeled “HELP,” which will lead you to additional information on using the Web.

The “home page” is the beginning point for entry into a primary Web information environment. To go directly to a Web site or home page, you can use its universal resource locator (URL) or path. There are several types of URLs, but the form that selects a Web site for browsing is similar to <http://www.lanl.gov>. To enter a URL, you may either select “File” from the main menu on the Web browser and, from the menu displayed, click on “Open Location,” or click on the open button on the tool bar. This will open a small window into which you will type the desired URL.

If you have set your browser to default to the LANL home page, then clicking on “home” will take you to the LANL home page. From this home page you can click on any underlined or highlighted topic to move you through the LANL Web pages and link to the information contained there. To establish LANL as your home page, follow the steps below using Netscape 4.04:

1. From the very top tool bar, pull down the “Edit” menu,
2. Select “Preferences,”

3. Click on the "Navigator" tab,
4. Click in the "Home Page Location" box,
5. Type <http://www.lanl.gov>, and
6. Click the "OK" button.

If a Web reference returns the error "Unable to find Application," or the wrong action occurs, you may need to configure your browser to point to a helper application. To accomplish this, follow the steps below using Netscape:

1. From the very top tool bar, pull down the "Edit" menu,
2. Select "Preferences,"
3. Click on the "Navigator" tab,
4. Highlight "Applications."
5. Numerous helper applications exist such as Telnet, Acrobat Reader, RealViewer, etc. Click on the help button to obtain more information about configuring the browser for your specific needs.

5.6. Network Information Resources

There are a wide variety of information resources available from the ICN and its connection into the Internet. This section will preview some Web pages.

5.6.1. Research Library Home Page

The Research Library's home page provides a link to general information about the Research Library including its collections, services, and publications, as well as links to other resources. Some of these resources are the Library's On-line Catalog, which is used for locating books and journal titles in the collection; subject resources for locating Internet information on physics, chemistry, biology/genetics, business, etc.; and Los Alamos publications including LA reports, *Dateline Los Alamos*, *LA Science*, and *Research Highlights*.



Library

Major effort has gone into the Subject Resources page. Librarians in the Research Library have responsibility for selecting appropriate Internet resources (such as the "Table of the Nuclides" and "Standard Atmosphere Computation") in their assigned subject areas.

5.6.2. Library Without Walls (LWW) Project

Several efforts within the LWW project are currently in progress. First is the on-line electronic document effort, which has a goal of capturing and displaying all Los Alamos report files in electronic form. The viewer for these report files is Adobe Acrobat, which creates files in PDF. Adobe Acrobat will run cross-platform on IBM DOS or Windows, Macintosh, and Sun SPARC UNIX. (Acrobat is available free from CIC-2, 7-4357.)



Library/Library without
Walls Project

5.6.3. Web Access to SciSearch and BIOSIS Databases

The Research Library's database SciSearch is based upon the Science Citation Index SciSearch Database, an international multidisciplinary index to science and technology literature maintained by the Institute for Scientific Information. The Research Library also offers access to BIOSIS, a citation index for



Library/
Electronic Databases

biological sciences, and INSPEC, a database for physics, electrical engineering, electronic engineering, and computer literature.

5.6.4. Network News Facilities

ClariNews is an electronic newspaper containing professional news and information delivered to your computer in the “usenet” news format and is updated continuously all day long. You can receive ClariNews through a standard news reader if your system is so configured.

USENET news is available from machine newshost.lanl.gov. You can access the news via several client news reader programs. Your workstation must be on a LANL network to read news from newshost.lanl.gov.



6. ENTERPRISE INFORMATION APPLICATIONS (EIA)



*Computing/Consulting Support/
Lab-wide Systems Consulting*

Enterprise Information Applications (EIA), formerly known as Labwide Business Information Systems, provide access to a wide variety of administrative information and resources. The applications have been designed to serve a wide range of users including clerical and technical support staff as well as management and professional staff. Enterprise Information Applications run in several environments: on IA and IB machines, as client-server applications, and on the Web. All applications can be accessed by PC and Macintosh workstations. UNIX workstations can access Web applications but not client/server applications.

Enterprise Information Applications do not include all the computer systems available at the Laboratory. They are information systems used by people “Lab-wide” as opposed to information systems used for special interest groups or computer systems used for scientific computing. Some of the applications, such as Time and Effort, Travel, and Employee Information, may be used by all employees. Other applications (e.g., Clearance) are specialized and require specific authorities for access.

The applications you use will depend on the tasks you perform on your job. To use these applications, you need the following:

- Communications links and the software to connect you to the computers where the EIA reside [Section 2, Tables 2.2., 2.3., and 2.4.];
- An ICN password and/or smartcard to permit access to IA and IB machines, the client-server GUI systems, and the Web-based systems [Section 2, Table 2.6.]; and
- System authorities appropriate for the work you need to do.

The standard interface for EIA has been character- and screen-oriented. There are now several applications that use GUI and run in a client-server architecture. The software to use these GUI applications can be downloaded from the ESD Web page. Call the CSC (665-4444) for assistance with downloading the applications. Some applications (e.g., Data Warehouse, JIT, Recharge) can be accessed on the Web. Call 665-4444 for assistance in using these applications.

6.1. Enterprise Information Applications Descriptions

Table 6.1. is an alphabetized listing of all EIA. Each entry contains the name of the system, a short description of the system's function, and the type of computing environment required to access the system.

Table 6.1. Enterprise Information Applications Descriptions

| Application Name | Description | Access |
|--|--|---------------|
| Affiliate Information System (AF) | View agreement, arrangement, and payment information on affiliates. HR-5, BUS-5, and managers only. | IA |
| Affirmative Action (AA) | Generate reports concerning the Laboratory's compliance with federal affirmative action policies. | IB |
| Automated Chemical Inventory System (ACIS) | Track chemicals and gases purchased for use at the Laboratory from receipt through disposal. | IB |
| Budget System (BUCS) | Query historic allocations. | IA |
| Building Manager System (BMS) | View and update lists of facility managers and building managers. FE only. Windows only. | Client/Server |
| Clearance System | Track clearance data. Badge Office only. | Client/Server |
| Data Warehouse | Generate reports from a wide variety of data (e.g., financial, facility, or recharge). Provides quick, ad hoc, and standard reports. | Client/Server |
| Data Warehouse | Generate reports from a wide variety of data (e.g., financial, personnel, facility, or recharge). Provides quick reports. | Web |
| Electronic Authorization System (EAS) | Determine access to EIA. | IB |
| Employee Development System (EDS) | Track employee training, view course information, request enrollment in Lab-sponsored courses, and request transcripts. | IB |
| Employee Development | Create courses and sessions, and enroll students. Trainers only. | Client/Server |
| Employee Information System (EIS) | Update Laboratory directory information. View employee salary, history, and directory information (i.e., personal, location, and address information for Lab and non-Lab employees). | IB |
| Facilities Project Information/ Work Order (FPI) | Track work-order costs and multiple construction projects from inception to completion. | IB |
| Financial Management Information System (FMIS) | Track the financial status of organizations and programs. Includes costs, allocations, and outstanding commitments. | IB |
| Invoice Approval System (IAS) | Review and approve invoices for purchase orders. Buyers only. Windows only. | Client/Server |

| Application Name | Description | Access |
|--|--|---------------|
| Invoice Approval System (IAS) | Review and approve invoices for purchase orders. | Web |
| Just-in-Time (JIT) | Search for and order items from Laboratory vendors' catalogs. | Web |
| Laboratory Authors System (AUS) | Track Laboratory research documents. Contains unclassified bibliographic citations. | IA |
| Mail Channels (MC) | View source document numbers, names, and addresses of authorized recipients; document security levels; and view special instructions and restrictions about transferring documents to authorized external personnel. | IA |
| Property Accounting, Inventory, and Reporting System (PAIRS) | Manage and administer active, excess, and retired property. | IB |
| PAIRS (Accountability Statement and Data Warehouse Reports) | Review and update property accountability statements and obtain property reports. For all employees who have property assigned to them. | Web |
| Purchase Card System (PCS) | Reconcile, approve, and review monthly statements of accounts. Cardholders and approvers only. | Client/Server |
| Purchasing, Accepting, Invoicing, and Disbursing System (PAID) | Pay vendors for goods and service. BUS only. | IB |
| Receiving/Procurement (RP2) | Track receipt of ordered goods. BUS only. | IA |
| Recharge System | View and update charge codes for CIC recharge services, including computing services, file servers, network services, and PAGES. For all users of CIC computing/network services. | Web |
| Resource Planning Module (RPM) | Plan and monitor budgets. Managers, business team leaders, and budget analysts only. | Client/Server |
| Salary Review System (SRS) | Distribute funds for salary increases. Managers only. | IA |
| Secretarial/Contract Services (SE) | Request temporary secretaries and contract workers; report contract workers' time. | IB |
| Signature Authority System (SAS) | Assign authorities so employees can purchase materials, transport hazardous materials, etc. | IB |
| Stores | Search for and order items from Laboratory vendors' catalogs. | IA |
| Time and Effort (TE) | Enter and approve Laboratory employees' time and effort. | IB |

| Application Name | Description | Access |
|-----------------------------|---|---------------|
| Time and Effort | Enter and approve Laboratory employees' time and effort. Perform mass recoding. | Client/Server |
| Training Questionnaire (TQ) | Fill out and approve questionnaire identifying required training for Laboratory personnel. | Web |
| Training Validation | Take on-line courses and tests necessary for job certification. System updates successful students' EDS records. | Web |
| Travel System (TR) | Submit and approve travel expenses online. | Client/Server |
| Work Request System (WRS) | Enter, route, approve, screen, and track work requests. Facility managers only. Windows only. | Client/Server |

Note: For applications on the IB and IA machines, you must have the appropriate communications software and configuration. Client/server applications can be downloaded from ESD.

Computing/Documentation/
Business Information Sys-
tems/Using IBM Systems



6.2. Authorities

To view or update information in EIA, you need to have authorities unique to each system. Lab employees and most contract employees are given limited authority automatically to view their own data. If your job requires you to see group or division information, you need additional authorities. In most cases, line managers assign additional authorities to their employees. An excellent user guide "Using IBM Systems" is available to help guide you through establishing authorities. For help with system authorities contact the Labwide Consultants at 665-4444 option 2 or labwide@lanl.gov.



7. COMPUTER TRAINING



Training/Computer

Classes are available for technical and advanced technical computer training. To register or get information regarding classes, go to the LANL home page and select Computing/Training. Listed below are some of the courses currently available. For additional help call the Training, Development, and Coordination team at 665-4444 option 4 or send e-mail to cic6-train@lanl.gov.

Table 7.1. Technical and Advanced Technical Computer Training Courses

Communications

- Eudora 3.x
- Lotus Notes 4.5
- Meeting Maker 4.1

Office Skills 2000

- Office Skills 2000: Part 1
- Office Skills 2000: Part 2

Web Authoring and Browsing

- FrontPage 98
- HTML Basics
- HTML Intermediate
- Jetform Filler
- Web JIT
- DIS Web
- EDS/Data Warehouse Web
- Eudora 4.0
- Meeting Maker 5.0
- Netscape 4.0
- Procurement Desktop
- Travel Web

Enterprise Information Applications

- Data Warehouse
- EDS - Basics
- EDS Training Plans
- Foreign Travel GUI
- Infomaker
- Invoice Approval System
- Purchase Card System
- Time & Effort GUI
- Travel GUI

Other Enterprise Information Applications

- Financial Management Information System (FMIS)
- Property Accounting, Inventory and Reporting System (PAIRS)
- Signature Authority System (SAS)
- Secretarial/Contract Services (SE)
- Salary Review System (SRS)

Application Training

- Advanced WWW Development
- FrameMaker Basic
- FrameMaker Advanced Features
- Foundations of IDL Programming
- IDL 5.0 Graphic Object Workshop
- Netscape Servers for Internet Development
- Origin2000 Applications Programming and Optimization
- Running on the ASCI Blue Mountain Systems
- Sendmail—Managing Internet Mail
- SGI Origin2000 for ASCI/ACL Programmers
- SGI ProDev Workshop
- Sybase Performance and Tuning for System 11
- Sybase SQL Server Administration
- UNIX (Beginning)
- UNIX (Advanced)
- Visual Basic 5.0 Fundamentals
- Visual C++ Windows Programming

Programming Training

- C Programming (Beginning)
- C Programming (Advanced)
- C++ for Experienced C Programmers
- C-Shell Programming
- Distributed Programming with Java
- Java Programming
- Java Programming Workshop
- Object-Oriented Analysis and Design Perl Programming
- Perl Programming

System Administration Training

- SGI System Administration (Beginning)
- SGI System Administration (Advanced)
- SGI Network Administration
- SGI Performance Evaluation and System Tuning for Origin2000 and Onyx2
- Solaris 2.X System Administration
- Solaris 2.X Network Administration
- Solaris 2.X Server Administration

8. SCIENTIFIC COMPUTING

[http://www.lanl.gov/asci/
Overview/summary.html](http://www.lanl.gov/asci/Overview/summary.html)



[http://www.lanl.gov/asci/
Platforms.html](http://www.lanl.gov/asci/Platforms.html)

[Computing/ASCI/
Blue Mountain/Getting Started](#)

8.1. Accelerated Strategic Computing Initiative (ASCI)

The U.S. commitment to end underground nuclear testing and constraints on nonnuclear testing calls for new means of verifying the safety, reliability, and performance of the US nuclear stockpile. While new weapon production has ceased, the ability to design nuclear weapons, analyze their performance, predict their safety and reliability, and certify their functionality as they age is essential for conscientious management of the enduring stockpile.

Dramatic advances in computer technology have made virtual testing and prototyping viable alternatives to traditional test-based methods for stockpile stewardship. Rudimentary versions of virtual testing and prototyping exist today. However, to meet the needs of stockpile stewardship in the year 2010, applications must achieve higher-resolution, three-dimensional, full-physics, and full-system capabilities. This level of simulation requires high-performance computing far beyond our current level of performance.

ASCI is a tri-laboratory and Defense Programs collaboration, in concert with IBM, Intel and Silicon Graphics (SGI), to create virtual testing and prototyping capabilities based on advanced weapon codes and high-performance computing. A powerful problem-solving environment is being established to support application development and enable efficient and productive use of the new computing systems. The LANL ASCI/SGI effort is referred to as ASCI Blue, Sandia/Intel is ASCI Red, and Livermore/IBM is ASCI Pacific. This capability is being made available for other scientific endeavors in an open unclassified environment using the Origin 2000 compute servers.

[Computing/Compute Servers](#)



[Computing/CIC Organizations/
Organization/CIC-7 Computing](#)

<http://register.lanl.gov>

8.2. Compute Servers

This section will help you choose the operating system and computer combination that are best suited to your computing needs by presenting a brief description for each operating system. Each description includes pertinent access information for each operating system, its typical uses, limitations, and characteristics.

The optimum system for a given computer application will vary with the characteristics of the code. The use of floating-point operations, the percentage of vectorized code, and the average vector length for the codes are some of these characteristics. Use the Register facility to obtain an account on the compute servers described in this section. Follow the steps below to register for access to ICN compute servers.

- Log in to the Register facility.
- Select Option 1 “Go to name registration.”
- From the subsequent menu select Option 2 “Register for ICN Computing Resources.”

A complete list of compute servers is found on the Web.

8.2.1. SGI Origin 2000

As a part of the ASCI project, LANL has established a complex of Silicon Graphics, Inc. (SGI) Origin 2000 compute servers (labeled as “nirvana.01,” “nirvana.02,” etc.) in the open computing environment. Each compute server consists of up to 128 CPUs. These servers are front-ended by two SGI Origin 200 systems currently called “bluemountain” and “mountainblue.” A similar arrangement is available in the secure environment except the compute servers are named “bluemtn01,” “bluemtn02,” etc.

Additionally, another SGI Origin 2000 compute server, “theta,” has been installed to provide a production computing environment for the more traditional applications at LANL.

Cellular IRIX is the operating system for the front-end Origins. It is UNIX System V and is POSIX compliant. The Origin 2000 architecture consists of shared memory machines with incremental parallelization. The machine can also be used in a “traditional” distributed memory message-passing way (i.e., MPI—message passing interface). This approach is based on providing the requisite computational resources through multiple clusters of shared-memory multiprocessor systems (SMPs) that have five components:

- hierarchical system of memories and latencies;
- multiple high-performance distributed systems;
- shared memory over a significant and economical computational resource;
- high-performance memory access; and
- multiprocessor, supporting a shared-memory environment across multiple processors.

8.2.1.1. Eligibility

At this time, access to the Origin 2000 computing resources is limited to those users who are involved with the following programs and/or projects:

- ASCI
- DOE Computer Hardware, Advanced Mathematics, and Model Physics (CHAMMP),
- DOE Grand Challenges,
- ACL/LANL sponsored projects such as Crisis Forecasting, Virtual Laboratory Testbed, Defense Special Weapons Agency, Laboratory Directed Research and Development, Nuclear Weapons Technology Programs.

8.2.1.2. Prerequisites

An active LANL Integrated Computing Network (ICN) account is a prerequisite for obtaining an account. This requires the following:

- an ICN open password has been established,
- a primary name has been established (use the ICN Registry),
- the forwarding e-mail address has been set (use the ICN Registry),
- registration ICN computing resources (ACL access) has been requested (use the ICN Registry), and

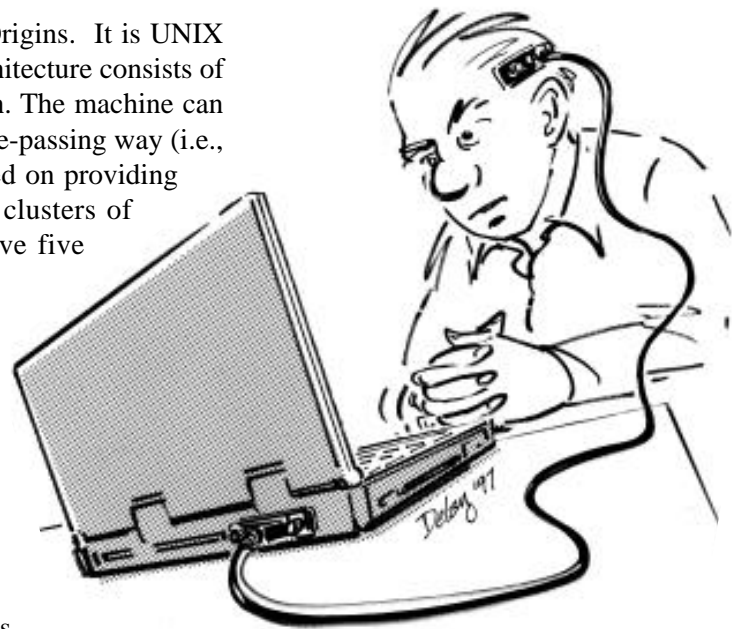


<http://www.lanl.gov/asci/bluemtn/Hardware/Openhardware.shtml>

<http://www.lanl.gov/asci/bluemtn/Hardware/Securehardware.shtml>

http://www.lanl.gov/asci/bluemtn/t_help.shtml

http://www.sgi.com/Technology/Irix6.4/cellular_irix6.4tr.html



<http://www.acl.lanl.gov/Resources/guidelines.html>

http://www.lanl.gov/ascii/bluemtn/t_runjobs.shtml



- the Open Blue Mountain Account Application form has been completely filled out and submitted.

8.2.1.3. Load Sharing Facility (LSF)

LSF is the load sharing and distributed batch-queuing software system that integrates the Origin network of computers. Jobs are submitted to the Blue Mountain cluster through queues that provide access to various machine groups, user groups, or resources.

8.2.1.4. Distributed Computing Environment (DCE)

DCE consists of a set of integrated tools, protocols, and methods that enable interoperability in heterogeneous, networked environments. In an ideal distributed computing environment, different types of computers, operating systems, and networks should interact as if they were all part of a single system. DCE is a set of services that can help achieve this goal—to deliver information from wherever it is stored to wherever it is needed without exposing the network's complexity to participants.

Sometimes DCE is referred to as middleware or enabling technology. Its services form a layer between applications that have been developed for distributed environments and the diverse computers, operating systems, and networks that make up a complex computing environment.

http://storage.lanl.gov/cic11/dfs/package/html/main/dfs_handout.html#intro



http://www.lanl.gov/ascii/DCE/Access/DCE_ClientInfo.html

8.2.1.5. The Distributed File System (DFS)

DFS is the key information-sharing component of DCE. DFS joins the file systems of individual workstations into a single virtual file system with a single name space, and it provides a consistent interface for users anywhere in the environment.

8.2.1.6. Visualization Software

Origin 2000 visualization utilities include the following:

- IBM Data Explorer (DX) general-purpose software package for data visualization and analysis.
- CEI EnSight Software package for visualization of results data.
- OpenGL, a high-performance 3-D-oriented renderer.

http://www.acl.lanl.gov/~hpp/foreign_data_conversion.html



8.2.1.7. Foreign Data Set Conversion

A series of examples are available that illustrate how to move files between CRAY PVP (PVP includes J90, C90, T90, [not IEEE] XMP, YMP), CRAY T3E and T3D, and Origin using the foreign data set conversion capabilities that are part of the Fortran I/O library.

[Computing/Documentation/Technical/Subject Listing/UNICOS](#)



[Computing/Compute Servers/UNICOS](#)

8.2.2. Cray UNICOS

UNICOS is used primarily for scientific computing with emphasis on large programs that require extensive calculations and significant internal storage. UNICOS supports a software-rich environment for many traditional computing applications. Large memory allocations per user on UNICOS permit effective and efficient computing of large problems. You can perform multiple computing tasks (with some limitations) by moving processes to the background. Documentation in support of UNICOS can be obtained by calling Cray Research, Inc. at (612) 683-5907.

The UNICOS operating system provides a UNIX-based System V environment, which conforms to the POSIX 1003.1 standard. This includes Berkeley Software Design, Inc. (BSD) extensions to the System V and sessions (similar to BSD job support), symbolic links, long file names, and signal support. Many performance tools are available with an X Windows System interface that makes hardware performance features much more accessible. The output of these tools can be shown and manipulated graphically, which allows you to interpret performance parameter relationships easily and optimize their codes. UNICOS itself does not provide for magnetic tape input or output. You may read and write magnetic tapes through the IES (an extension of CFS), where they would be accessible from UNICOS.

A locally developed CPU scheduling algorithm, known as opportunity scheduling is installed on all UNICOS systems. The objective of “opportunity scheduling” is to give users direct control over their available CPU time. By adjusting user-adjustable priorities and relative shares, a user organization can ensure that its most important work is always completed, irrespective of the total load on the machine. (UNICOS previously used a process called the “fair share scheduler” to allocate resources).



*Computing/Compute Servers/
UNICOS/Opportunity Scheduling*

Computing costs are calculated by charging for the use of specific UNICOS resources based on whether the computing is interactive or batch-type as submitted through the production- or batch-workload manager.



*Computing/Computing
Resources/Charge Rates*

8.2.3. Gamma YMP (UNICOS)

Gamma’s CPUs are identical to those on the other YMPs, and both Gamma and the other YMPs run on a 6.0-nanosecond clock. The charge rates are lower because Gamma uses a slower, less expensive memory technology known as “Dram.” Longer fetch times cause the CPU to spend more time waiting for data. The exact delay depends on the application, but on average processes take 15% longer to run. The reduced CPU charge for Gamma compensates for the longer CPU times, ensuring that, on the average, applications will cost the same to run on Gamma as they would on any other YMP.

An advantage of using Gamma is that there are two gigawords of 64-bit core memory—ideal for fine meshes and three-dimensional calculations. Smaller, open-partition jobs should be submitted to “rho,” where codes will often run faster.

8.2.4. Massively Parallel Supercomputing—T3D

The Cray T3D massively parallel supercomputer is a true multiple-instruction, multiple-data (MIMD) machine located in the secure environment. Previously, all MPP code development in the secure ICN had been of the single-instruction, multiple-data (SIMD) variety provided by the Thinking Machines Corporation CM-200. In SIMD machines the same instruction is executed by every processor on a different set of data. MIMD machines such as the T3D and the TMC allow the execution of different instruction streams simultaneously on different sets of data.

The T3D has as its front end an 8-processor Cray YMP with 128 megawords of 64-bit static random access memory (SRAM) for operating system functions

such as I/O and process management. The T3D and YMP, which are known collectively as machine Tau, provide 512 Digital Equipment Corp. Alpha EV4, 150 megahertz processing elements (PEs) distributed over the high-speed “Torus” network. These PEs have access to 32 gigabytes of distributed SRAM, four times that available on the CM-200.

The T3D is suited to jobs appropriate for an MPP system: your application must be parallel, it must be distributed among the processors efficiently, and it must keep all processors busy with useful work almost all of the time.

Computing/Compute
Servers/Cluster



8.2.5. Open Network Compute Server (ONCS)

The ONCS is intended to offer you a low-cost alternative to the Cray YMP. It is suitable for large-memory, parallel jobs with moderate I/O requirements. The cluster currently consists of eight IBM RISC System/6000 Model 590 workstations and two RISC System/6000 SP-2 running AIX, IBM's implementation of UNIX. Each node has a 66-megahertz clock. These machines are “super-scalars” meaning they can execute more than one command per CPU clock cycle. File size limitation is 2 gigabytes.

Charges for the ONCS are based on CPU time, memory, and disk usage. Check your resource usage by typing

```
/usr/local/bin/get_usage
```

8.2.5.1. Converting Code to Run on a Cluster

Code that runs on a UNIX workstation should run with minimal modifications on any individual node of either the open or secure cluster. The current approach for running in parallel among multiple nodes is to modify code to call the Parallel Virtual Machine (PVM) library, which takes care of all communications between machines. Alternatively, you can use MPI, or if you are using FORTRAN, use high-performance FORTRAN (HPF).

<http://saaz.lanl.gov/lsf.html>



8.2.5.2. Balancing and Distributing Workload with Load Sharing

The LSF from Platform Computing Corp. is a load-sharing and distributed batch-queuing software suite. LSF integrates a network of UNIX systems to reduce interactive response time, increase batch throughput, and improve computing resource accessibility while supporting parallel applications. LSF schedules jobs based on the availability and load of heterogeneous hardware and software resources as well as on the resource requirements of the jobs, ensuring that jobs run on the best available machines. Fully transparent remote processing of jobs is supported, including remote terminal I/O, signals, and file access. Job accounting data and analysis tools are also available. LSF is highly fault-tolerant and supports job “checkpointing” and migration. A Motif-based GUI to interface with LSF is also available.

The Open Cluster is accessed via Telnet, FTP, “klogin,” or “kshell” from another open machine. After you log on to the open cluster machines, you need a Kerberos ticket for CFS access. The available Kerberos commands are “k4init,” “k4rlogin,” “k4rsh,” “k4rcp,” “k4list,” and “k4destroy.” Accounts for new users are added manually.

8.3. Software Cross-Reference Tables

Table 8.1. Languages, Libraries, Maintenance, and Debuggers

| Component | UNICOS | Cluster | SGI Origin 2000 |
|--|---|--|---------------------------------|
| System Libraries | ASDEF CFTLIB LIBSCI | | |
| Mathematics Libraries | CRAYMATH IMSL CLAMS | CLAMS MAPLE MATHEMATICA | SCSL |
| Graphics Libraries | CGS, GKS CGSHIGH, RSCGI DISSPLA, SC4020 NCAR PXXLIB | CGS CGSHIGH OPEN GL3D NCAR PHIGS ILW3D | |
| Source Maintenance | HISTORIAN BLD, CVS | GNUMAKE CVS | CVS |
| Debuggers Static Dynamic | TotalView LDB CTRACE | DBX XLDB GNUGDB | TotalView |
| C, C++ FORTRAN 77 FORTRAN 90 Lisp Pascal Perl | C, CC CF77, CFT77 F90 PASCAL | C, C++, GCC, GCC+ F77 F90, XL | C, CC F77 F90 Perl |

Table 8.2. ICN Accounting Information

| Utility | System Access | Function | Options and Features |
|----------|---------------|---|--|
| Recharge | Web | Retrieves account information from “use” databases. | Interactive; permits accessing information by system, user, etc. |

Table 8.3. ICN On-line Help Information

| Facility | System | Function | Options and Features |
|----------|----------------|---|---|
| WWW | local | Browse LANL or the Internet. | Use Netscape Browsers. |
| MAN | UNIX UNICOS | Quick reference information about utilities and command syntax. | Lists commands and keywords. Displays information for commands. |
| CLAMDOC | UNICOS | Mathematical library information. | Retrieval by routine name, category, or keyword. |

Table 8.4. Text Editors

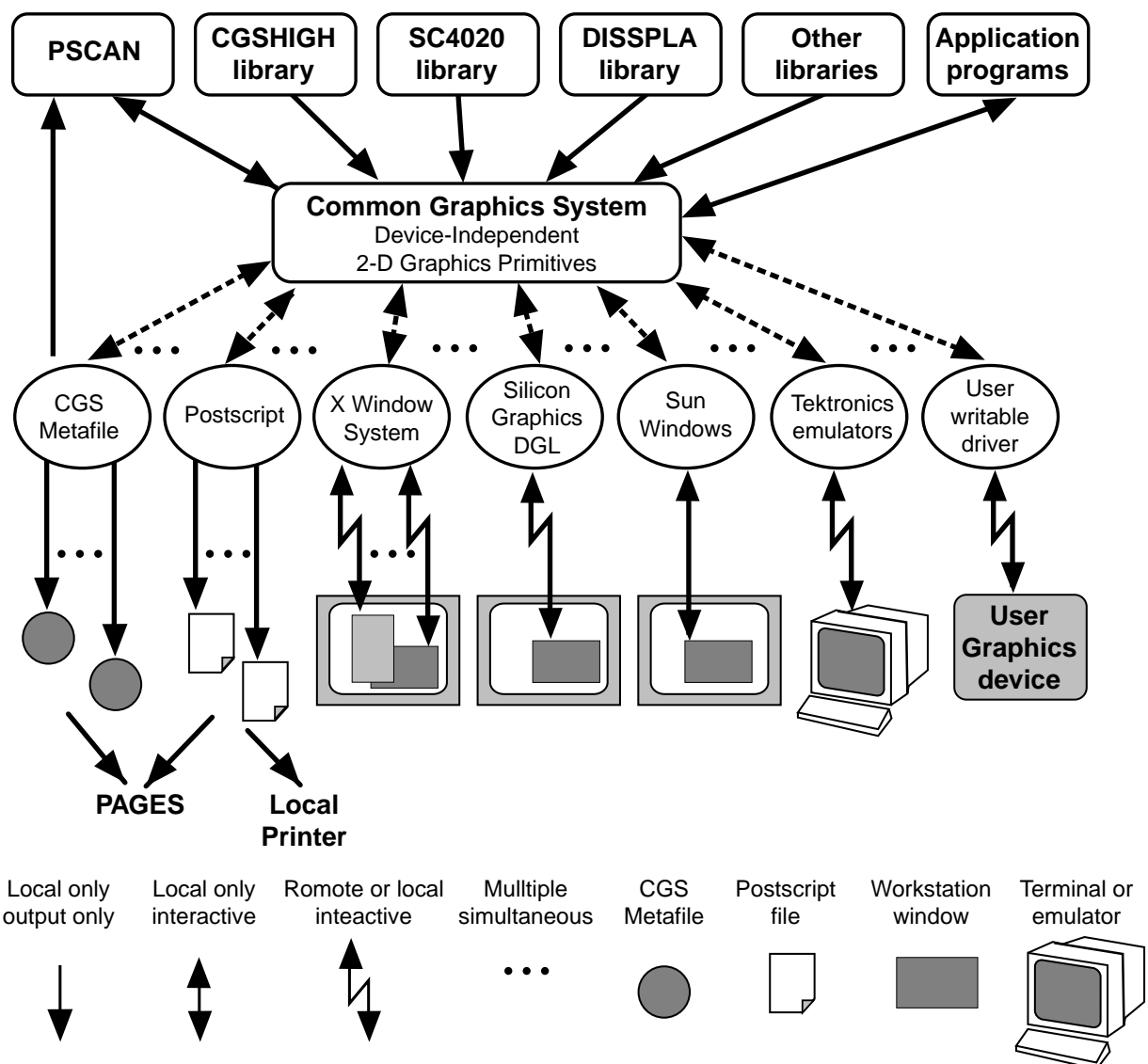
| Editor | Systems | Key Options |
|---------------|-------------------|--|
| VI | UNIX | Standard UNIX editor, multiple file access, subset of EX editor. |
| Visual Editor | UNICOS | Automatic indent and tab set. |
| EMACS | UNICOS Cluster | Cray supported. |
| FRED | All | Standard ICN line editor, DO loop extensions. Strong command set Conditional IF functions. |

8.4. Graphics Facilities

8.4.1. Device-Independent Graphics

At Los Alamos, the graphical display of data has become an important scientific tool for users of the ICN. Device-independent computer graphics are provided on most of the computing systems at Los Alamos by the Common Graphics System (CGS) and various graphics libraries. CGS provides a foundation for your application programs and higher-level plotting libraries by providing two-dimensional, device-independent graphics primitives. Higher-level graphics libraries built on top of CGS include CGSHIGH, DISSPLA, and the SC4020 emulation library. [See Figure 8.1.]

Figure 8.1. Current Structure of CGS



CGS is an evolving product. It was designed to adapt to changing display technology and computing environments while remaining general purpose, flexible, and easy to use. It provides a constant interface to device-level graphics in a changing world. Device formats currently supported by CGS include the X Windows System, Silicon Graphics Distributed Graphics Language, SunWindows, Tektronix terminals and emulators, PostScript, and the CGS metafile. The CGS metafile is a device-independent representation of graphics that can be plotted on PAGES graphics devices or postprocessed by PSCAN and displayed on any CGS-supported graphics device. CGS is supported on UNICOS, the cluster, VMS, ULTRIX, OSF1, and all of the workstations using the UNIX operating system at Los Alamos.

CGS supports graphics primitives including points, lines, polygons, and text. Both hardware and software text are supported including 19 fonts with text size and orientation control. Many primitive attributes are supported including line style, line width, intensity, direct color, and indexed color. Interactive cursor input is supported on interactive devices. All of this is done in a way that allows your application program to remain independent of any specific graphics device. In addition, device-specific features are available if needed via a CGS escape function.

*Computing/CIC Organizations/
Organization/CIC-8/The Graphics
and Visualization Team/
Graphics and Visualization
Software/Software at a Glance*



An excellent table that summarizes the various graphics libraries, utilities and postprocessors is found on the Web.

8.4.2. Graphics Devices

Most of the popular capabilities of the various graphics devices that are supported include the ability to display sequences of plots as movies, to have multiple simultaneous windows open, to resize plots within windows automatically, to control multiple windows on more than one workstation from a single process, and many other features as appropriate to the device. CGS also provides a mechanism for the user to write his/her own CGS device driver for non-standard graphics devices.

Users can plot on one or more devices simultaneously or selectively control which device is to receive graphics output. The process of selecting a different graphics device is as simple as changing a subroutine call to select that device. Many CGS applications are gaining access to X Windows and PostScript with a minimum of effort. The average Fortran or C programmer probably spends less than half an hour converting an application program to X Windows and PostScript output.

*Computing/CIC Organizations/
Organization/CIC-8/Graphics
and Visualization Team*



8.4.3. Virtual Reality (VR)

VR is a form of computer graphics that seems to immerse the user in a synthetic space. This is done by using the following:

- One or more computer-graphics-rendering engines for generating viewable surfaces,
- Head-mounted display for viewing the virtual world while masking out the real world or, alternatively,

*[http://www-c8.lanl.gov/
graphics_vis/vis_video_lab/
map.html](http://www-c8.lanl.gov/graphics_vis/vis_video_lab/map.html)*



- 3-D liquid crystal glasses for viewing stereoscopic images projected onto a screen,
- Data gloves and body suits for detecting positions and movements of the participant,
- Position trackers to measure the location and orientation of the head and perhaps other objects,
- 3-D sonification for creation of an aural environment, and
- Voice recognition equipment.

The VR machine allows you to have the experience of being “inside” the model. By using the kinematics of your body to move around the model, the VR machine greatly enhances the understanding of spatial inter-relationships.

8.4.4. Visualization/Video Laboratory

The Visualization/Video Laboratory can help you sort through the many choices available to leverage this powerful technology efficiently. Visualization/video services include the following:

- Consulting and assistance on visualization tools, techniques, software, and methods;
- Coding of specialized routines for project-specific goals;
- Animation production from computer-generated data including recording facilities for PAGES production videos;
- Interactive recording sessions directly from workstation screens;
- Editing, titling, and audio dubbing of visualization videos;
- Creation of digital video for delivery via the Internet; and
- Translation between various graphics file formats.

Work in the Visualization/Video Laboratory relies on a mix of software from three categories: locally developed, freeware/shareware, and commercial. A list is also maintained of the various software in use at visualization laboratories around the country.

8.5. Mathematical Software Libraries

CIC Division maintains a large and valuable collection of mathematical and statistical software. Many of the libraries mentioned below are available from the “netlib” facility at Oak Ridge National Laboratory. Any source code available through this Web interface is free of charge, but it will not be guaranteed.

Below is a list of Los Alamos’ mathematical and statistical libraries that are available on various computers maintained by CIC Division.

- General mathematics and statistics—IMSL (on Cray PVMs)
- Eigensystem solvers—EISPACK (in CLAMS)
- Linear Equation Solvers—LINPACK (in CLAMS)
- Nonlinear Equation Solvers—MINPACK (in CLAMS)
- Ordinary Differential Equations—ODEPACK (in CLAMS)
- Technical Computing Packages—Mathematica and Maple



http://www-c8.lanl.gov/graphics_vis/vis_software/vis_sw.html

http://www-c8.lanl.gov/graphics_vis/vis_video_lab



<http://www.netlib.org>

8.5.1. Common Los Alamos Mathematical Software (CLAMS)

The philosophy of CIC Division is to provide and maintain a common library of all supported mathematical software routines. Mathematical software libraries for the major ICN systems are built from this common source. CLAMS is a result of this philosophy.

The CLAMS library contains most of the routines in the SLATEC Common Math Library as well as routines unique to Los Alamos. The CLAMS library and associated documentation is on the CIC Division “icn-tools” information server. Currently supported platforms are as follows:

- Cray UNICOS,
- DEC Alphas running Open VMS,
- HP series 700,
- IBM RS 6000,
- Silicon Graphics, and
- Sun.

By mounting the appropriate files from “icn-tools,” you will have access to the latest version of CLAMS without using local disk space. CLAMDOC is an interactive on-line documentation program that provides retrieval by routine name, category number, or keyword(s). The utility may be accessed by entering the command “clamdoc” at your terminal. On the DEC machines, the on-line documentation utility “clamdoc” is available. On the UNIX machines, “clamdoc” and the “man” pages for both CLAMS and clamdoc are available. To access files on “icn-tools,” contact your local system administrator. Find this software on the Web.

On UNIX systems, assuming that the files exported from “icn-tools” are in /usr/lanl on the local machine, you should have /usr/lanl/bin in your path variable, /usr/lanl/lib in your LD_LIBRARY_PATH environment variable, and /usr/lanl/man as your MANPATH variable. On Sun workstations, you should be using /mathlib/clams/unix.

On CFS under /ccx/sun you will find “clams.tar” and “clamdoc.tar.” Use the command “untar” and check out the “readme” or “make” files. CLAMDOC is the documentation program for the CLAMS library.

The SLATEC source is available from the Web.

New CLAMS documentation is available on the Web.

8.5.2 International Mathematical & Statistics Library (IMSL)

IMSL is a commercial, proprietary subprogram library developed by Visual Numerics, Inc. It contains about 4000 FORTRAN subprograms that handle a variety of mathematical and statistical problems. The user command “imsl doc” exists on UNICOS and is the equivalent, for the IMSL library, of CLAMDOC.

The primary usefulness of IMSL for Los Alamos users is in its extensive statistical library, which includes data reduction, multivariate analysis, sequential analysis, random-number generation and probability distribution, permutations

<http://www.netlib.org/liblist.html>



<http://www.lanl.gov/Internal/divisions/cic/cic8/para-dist-team/MATH/clams.html>



and combinations, subset generators, nonparametric statistics, and hypothesis testing. IMSL also provides some subprograms not available in CLAMS, such as operations on polynomial splines, elliptic integrals and functions, and methods for two-point boundary problems.

8.5.3. Mathematica and Maple

Mathematica and Maple are available on the open cluster. Both are software systems for numerical, symbolic, and graphical computations and visualization. Both deliver an interactive calculation tool and programming language for solutions to technical problems. Mathematica's electronic documents called "notebooks" let you organize your text, computations, graphics, and animation for technical reports, presentations, or records of your work. And you can use MathLink, Mathematica's communication protocol, to exchange information between Mathematica and other programs. Mathematica is available for over 20 computer platforms.



<http://saaz.lanl.gov/tutorial.html>

8.5.4. Parallel Object-Oriented Methods and Applications (POOMA)

Scientific application codes such as those that run on LANL's Origin 2000 supercomputers are extremely large, complex computer programs that previously had to be painstakingly rewritten whenever hardware or software changed significantly. The POOMA framework is a software infrastructure designed to simplify the development of scientific application codes on parallel computer architectures.



<http://www.acl.lanl.gov/PoomaFramework>

Application codes written with POOMA are capable of running on serial, distributed, or parallel computer architectures with no changes to the code. Application developers express the fundamental scientific content and numerical methods of their problems using high-level language constructs similar to simple mathematical notation; they need not be familiar with the details of C++ object-oriented programming.

http://www.lanl.gov/Internal/divisions/cic/bits/archive/97november/Reynders_POOMA.html

This framework is not only easy to use but also extremely agile and portable across rapidly evolving high-performance computing architectures. It can be used not only on parallel supercomputers, such as Blue Mountain, but also on common scientific workstations.

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INTEGRATED COMPUTING NETWORK (ICN) VALIDATION REQUEST

Instructions:

- (1) Complete all parts of this form that apply to you. Please take note of the "Special Requirements" section and complete any applicable parts.
- (2) Manager (Group Leader or above) authorization and signature are required for all validation requests.
- (3) Before submitting this request, ensure that your Employee Information System (EIS) information is current.
- (4) Once completed, either mail this request to the Password Office at MS-B251, fax it to (505) 667-9617, or, if you are cleared, handcarry it to TA-3, SM-200, Room 257.

If you have **questions** call (505) 665-1805 or send e-mail to validate@lanl.gov

Owner Information

| | | | |
|----------------------------|--------------|------------------------------------|--|
| Z-Number (if you have one) | | Name (last, first, middle initial) | |
| LANL Group | Phone Number | LANL Mail Stop | Citizenship (Foreign National see "Special Requirements-Foreign National") |

Check LANL affiliation:

☐ LANL employee

☐ Contractor _____
(specify contract company)

☐ External user _____
(specify employer)

☐ Other (specify) _____

Send password / smartcard to:

☐ Mail Stop or ☐ Mail to address indicated below

Name / Organization

Address

City, State, Zip Code

Access Check access method and needed partitions:

| | |
|--|---|
| Access method: <input type="checkbox"/> ICN Password <input type="checkbox"/> Smartcard <input type="checkbox"/> Both | |
| <input type="checkbox"/> Open partition (e.g., open machines, or for dial up access) | |
| <input type="checkbox"/> Administrative partition (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS]) If you are not a cleared LANL employee, see required steps in section "Special Requirements-Administrative Partition". | |
| <input type="checkbox"/> Secure partition (i.e., secure machines) A Q-clearance is required for secure access. After obtaining Manager signature for Secure access, handcarry this form to the Password Office to obtain your Secure account. | <div style="border: 1px solid black; padding: 5px;"> <p>I certify this person does require secure access:</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> _____ Manager Signature (Group Leader or above) _____ Date </div> </div> |

Password Office Use Only

| | | | | | |
|---------------------------------|------------------------------------|------------------|-----------|----|--------------------|
| New <input type="checkbox"/> | Change <input type="checkbox"/> | Clearance Status | Processed | Lv | Smartcard Serial # |
| Comments: | | | | | |

Special Requirements

Administrative Partition

Lab-Wide Systems (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS])

☐ Under 18 years of age

If you need to access Administrative systems, your Group Leader must provide a memo accepting responsibility for your actions and justifying your need for access. This memo is to accompany all forms taken to the security briefing (see "Contractor or Non-Cleared") section below. You may not access the Secure Partition.

☐ Contractor or Non-Cleared

Phone (505) 665-4444 (option #2) to obtain Access Authorization packet.

Phone (505) 667-9153 to schedule a security briefing.

Bring all forms including this ICN Validation Request to the security briefing for approval.

CIC-6 Security Briefing Approval Signature

Date

☐ Foreign National

Attach a copy of Form 982 (REQUEST FOR UNCLASSIFIED VISIT OR ASSIGNMENT BY A FOREIGN NATIONAL) with all approval signatures. Be sure Box #11 of Form 982 is completed. If you are not a visitor/assignee under a LANL/DOE approved Visit / Assignment Request, attach written justification from your host Group Leader or Division Director describing your need to access the ICN.

Authorization (required)

| | | |
|--|------------------|-------|
| Print Manager Name (Group Leader or above) | Manager Z-Number | Group |
| Manager Signature (Group Leader or above) | Mail Stop | Date |

If you are NOT a LANL employee you must have a LANL contact and obtain the contact's signature in addition to the contact's manager's signature.

LANL contact: Read the following and sign below.

By signing this form I affirm that I understand and accept the following:

- I am a regular Laboratory employee.
- I am responsible for forwarding password reauthorizations and verifying annual account reauthorizations for this user.
- I am responsible for notifying the Password Office within 10 days of changes in my status.
- I am responsible for notifying the Password Office immediately of changes in this user's status (termination, end of contract, etc.).

| | | | |
|-------------------------|------------------|--------------|-------|
| Print LANL Contact Name | Contact Z-Number | Phone Number | Group |
| LANL Contact Signature | Mail Stop | Date | |

NOTE: All Laboratory computers, computing systems, and their associated communication systems are for official business only. By completing this validation request and signing for a password and/or smartcard, you agree not to misuse the ICN. The Laboratory has the responsibility and authority to periodically audit user files.

We wish to express our appreciation to the many people who contributed information to this issue and to those who gave their time to review its content.

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This third edition of BITS: Introduction to Computing at Los Alamos is designed to provide an overview of the primary computing resources and to serve as a road map to additional information. The regular BITS issue is published monthly to highlight recent computing and communications activities within the Laboratory. We welcome your suggestions and contributions. Both versions of BITS can be accessed electronically via Web browsers such as Netscape. Enter the following URL:

<http://www.lanl.gov/cic/publications.html>

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